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A HISTORY OF THE MEDICAL DEPARTMENT
OF THE
UNITED STATES ARMY

A HISTORY OF THE MEDICAL DEPARTMENT OF THE UNITED STATES ARMY

BY

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WITH AN INTRODUCTION BY

SURGEON GENERAL MERRITTE W. IRELAND



BOSTON AND NEW YORK
HOUGHTON MIFFLIN COMPANY

THE RIVERSIDE PRESS, CAMBRIDGE

1929

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The Riverside Press
CAMBRIDGE . MASSACHUSETTS
PRINTED IN THE U.S.A.

Some there be, which have no memorial:
who are perished, as though they had never been.

Ecclesiasticus, XLIV, 9

To all such Unknown Soldiers of the Medical Department
this book is dedicated

PREFACE

I HAVE wondered whether I was made librarian of the Surgeon General's Office in order that I might write this history or if General Ireland interested me in the matter because I hold that position. At any rate, after I heard him express a desire that the work be done, a short investigation of the abundant material at my command aroused my interest and set me at it.

At first I planned merely to bring up to date the 'History of the Medical Department' written by Assistant Surgeon Harvey E. Brown and published as a government document in 1873, but that book was found to contain matters which were neither interesting nor important and to omit others which were both. In addition, it was long out of print, rare, and, to most persons, inaccessible. For these reasons I decided to cover the history of the Department from the beginning, so condensing as to get it all in one volume so small as not to discourage by its outward appearance.

I was most fortunate in the assistance given me. To General Pershing I express gratitude for his sketch of General Ireland; to General Ireland for his interest in my work and his assistance in checking facts. Lieutenant Colonel Louis C. Duncan, whose interesting articles on 'The Medical Department in the Civil War,' 'Medical History of General Scott's Campaign to the City of Mexico in 1847,' and 'A Medical History of General Zachary Taylor's Army of Occupation in Texas and Mexico, 1846-1847,' published in 'The Military Surgeon' in 1913, 1920, and 1921, had excited my interest and led me to seek his aid, has helped me very greatly. Lieutenant Colonel Fielding H. Garrison, whose working room adjoins mine, was ever willing to advise and assist me from the richness of his wisdom, learning, and experience as a writer and America's greatest authority on the history of medicine. I am also indebted to all those gentlemen who have written out the

personal reminiscences from which I have quoted, and to the personnel of the Army Medical Library, particularly to Miss Virginia Bowie, for cheerful assistance given.

Having had all this excellent help, I am emboldened to hope that the story of growth and development which has so interested me may also interest others.

P. M. A.

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INTRODUCTION

FOR many years I have desired that the history of the Medical Department be written up to date and in a form apt to attract all officers of the Department to read it. Harvey Brown's history was published in 1873, before the era of modern medicine or the period of modern armies. *The Medical and Surgical History of the War of the Rebellion* and *The Medical Department in the World War* are monumental works of reference, but not works into which others than historians, investigators or seekers of statistical data are apt to penetrate. They are not the type of literature to be read of an evening for pleasure, or for easy enlightenment as to the *story* of the Department. That story had not been told in one volume, yet I knew it to be an interesting story, at times sad or tragic, occasionally amusing, always a story of growth, achievement and advance, always one which should be known to our people, but particularly to the officers of the Medical Department.

From the time of my appointment to be Surgeon General I planned to have this history written, but that has been a busy time for all members of the Medical Department, and I could not notice that any one manifested a great interest in my ambition until Colonel Ashburn was made Librarian of the Army Medical Library, which is generally known to the medical world as the Library of the Surgeon General's Office. When he learned of my desire to have the history written, he took an interest in the matter and that interest soon brought to his attention such a wealth of material in his own possession as librarian, soon revealed to him so engaging a story that he entered with enthusiasm upon the preparation of it. He has produced such a book as I hoped to see, has told a story that is true, wholly free from exaggeration, documented and accurate, but not long drawn out or hard to read. It is my hope that every regular and reserve officer of the Medical Department will familiarize himself with this story, will

set his face and his heart to the promotion of the splendid progress which the Department has made with the growth of modern medicine. I hope that all will appreciate, imitate, and perpetuate the fine qualities of such men as Isaac Senter, James Mann, James Lovell, William Beaumont, George Suckley, Jonathan Letterman, and John K. Billings, who in less enlightened days, and despite lack of knowledge and equipment which we deem absolutely necessary, were nevertheless men of light and leading in the Department and performed services which we should delight to honor.

The Medical Department, the Army, and our Country are all to be congratulated upon the fact that our reserve of officers is growing, that the medical, dental, veterinary, nursing and kindred professions of the country are all ready to do their parts again as in the World War, to become again parts of the Medical Department, to help it perform its tasks, to make possible the performance of those tasks. I hope that this story of the Department will become familiar to those professions and to the public in general, in order that all may know of the difficulties which have confronted and hampered it, and may so be led to give to the Department, in even larger measure than before, the sympathy and support without which it can never operate at highest efficiency.

The Medical Department is not apt to be the object of great popular enthusiasm in time of war. At its best, it is taking care of those who are out of luck, or is engaged in humble tasks looking merely to keeping men fit for work which will bring glory to others than the Department. The achievements of a Beaumont, a Reed, or a Gorgas attract the attention of the world, but of course such men and such achievements are rare. Most Medical Department officers lead rather obscure lives, as do most of their confrères in civil life, yet we like to believe, and I do believe, after thirty-seven years of army life, that we are doing worth-while work, are useful to the Service and the State, and that our usefulness is growing now as it has grown in the past.

Our lives contain as few regrets, perhaps, and as much of satis-

faction as those of any group of men to be found anywhere; our story, while by no means entirely a matter for pride, is at least a story of honest effort, of continual striving, of unselfish service, of steady improvement, of very honorable and very great achievement, a story we should like for the world to know. I commend it to your attention.

M. W. IRELAND

Surgeon General, U.S. Army

A HISTORY OF THE MEDICAL DEPARTMENT OF THE UNITED STATES ARMY



PART ONE

THE FIRST CENTURY

Wonderful little, when all is said,
Wonderful little our fathers knew.
Half of their remedies cured you dead —
Most of their teaching was quite untrue —
'Look at the stars when a patient is ill.
(Dirt has nothing to do with disease,)
Bleed and blister as much as you will,
Blister and bleed him as oft as you please.'
Whence enormous and manifold
Errors were made by our fathers of old.

KIPLING: *Our Fathers of Old*

A HISTORY OF THE MEDICAL DEPARTMENT OF THE UNITED STATES ARMY



PART ONE THE FIRST CENTURY CHAPTER I

1775-1818

THE history of the Medical Department begins with that of the Army, at Boston in 1775. Prior to that time there had been no army, merely a few colonial militia organizations, widely separated, without a common command, modeled upon the English regiments and, usually, falling so far short of them as to justify the song 'Yankee Doodle' and the 'Hay foot—Straw foot' story. The surgeons of these organizations, when they had any, were appointed locally, usually by the colonels.

Of those physicians of Revolutionary days attaining sufficient eminence to be included in Thacher's 'American Medical Biography,' many did not serve as doctors in the war. This is not to be taken as a reflection upon the patriotism of the profession. Doctors then took a much larger part than now in public life. The number of medical men who were legislators, judges, governors, or occupants of other positions of dignity and distinction is surprisingly large. Unquestionably the medical man was more of a publicist and civil leader than now. As a few examples are cited Samuel Holton, a doctor, President of Congress in 1780; Arthur Lee, Minister to France in 1776; John Bartlett, who cast

the first vote for the adoption of the Declaration of Independence and was the first after the President of Congress to sign it. He was later Chief-Justice and Governor of New Hampshire, as well as a colonel in the Continental Army. Five of the fifty-six signers of the Declaration were medical men, as were twenty-three members of the Provincial Congress of Massachusetts in 1774-75. Many others served in the line of the Army.

Joseph Warren — Major General of Militia; killed at Bunker Hill.

Oliver Prescott — Major General of Militia; brother of Colonel Prescott, of Bunker Hill.

John Brooks — Major General of Militia and Governor of Massachusetts.

John Beatty — Colonel; later, member of Congress.

John Thomas — Major General; followed Montgomery in command of Canada Expedition; died of smallpox.

Nathanial Freeman — Colonel and judge.

Hugh Mercer — Brigadier General; died as result of seven bayonet wounds and a blow on the head, received at Battle of Princeton.

Arthur St. Clair — Major General.

Edward Hand — Brigadier General.

William Irvine — Brigadier General.

Henry Dearborn — Colonel in Continental Army; later a Major General.

John Knight — Captured with Colonel Crawford by Indians; witnessed Crawford's torture and death, but himself escaped.

James McHenry entered the Revolution as a surgeon, was captured and held prisoner, became secretary to Washington, aide-de-camp to Greene and to La Fayette, and was Secretary of War in the presidencies of Washington and Adams. Fort McHenry was named in his honor.

William Eustis, a surgeon throughout the Revolution, was subsequently member of the legislature of Massachusetts, member of Congress, Secretary of War, Minister to Holland, member of

Congress again, and Governor of Massachusetts. Fort Eustis is named in his honor.

Congress resolved on October 16, 1781, 'That Thursday next be assigned for electing a deputy purveyor for the military hospital, in the room of Doct. Brownson, who is elected governor of Georgia.' This was Dr. Nathan Brownson.

John S. Billings stated in 1876 that the number of medical men in America who possessed medical degrees at the outbreak of the Revolution was about two hundred. Estimates as to the total number of men then practicing medicine in this country have been as high as thirty-five hundred. J. M. Toner¹ was able to gather the names of nearly twelve hundred different physicians who served in the Army or the Navy during the Revolution. One hundred of these had medical degrees.

There is little record of American regimental medical practice of that day, such as there is being reflected mainly in legislation which indicates that it was poor.

It is true that James Thacher, M.D., who served throughout the Revolution, from 1775 to 1783, as a surgeon's mate in hospital and as regimental surgeon, wrote a military journal² which is a valuable source of information in regard to the Revolutionary Army. John Adams wrote that 'it is the most natural, simple and faithful narration of facts that I have seen in any history of the period.' Unfortunately, Thacher seemed to regard his own work and the hospitals as too commonplace and too uninteresting to the general public to deserve much description. His references to medical matters are brief, infrequent, and not very informative; not at all comparable to his remarks about army spirit, personalities, habits, punishments, marches, food, etc. The principal medical notations relate to smallpox inoculation, which was carried out on a large scale, and a description of hospital work in

¹ *The Medical Men of the Revolution*. Philadelphia. Collins, printer, 1876.

² *A Military Journal during the American Revolutionary War, from 1775 to 1783, etc.* By James Thacher, M.D., Late Surgeon in the American Army. Boston: Published by Cottons & Barnard, 184 Washington Street. John Cotton, printer, 1827.

Albany, dated October 23, 1777, after Burgoyne's surrender. He states that there were then not less than a thousand wounded and sick in the city, including British and Hessians, who were treated by their own surgeons. He highly praised the skill of the British surgeons, but found the Hessians uncouth and clumsy. There were thirty American surgeons and mates on duty, all very busy.

The following bit about scalping is of the same date: 'Captain Greg was immediately carried to the fort, where his wounds were dressed. He was afterward removed to our hospital, and put under my care. He was a most frightful spectacle; the whole of his scalp was removed; in two places on the fore part of his head the tomahawk had penetrated through the skull; there was a wound on his back with the same instrument, besides a wound in his side and another through his arm by a musket ball. This unfortunate man, after suffering extremely for a long time, finally recovered, and appeared to be well satisfied in having his scalp restored to him, though uncovered with hair. The Indian mode of scalping their victims is this — with a knife they make a circular cut from the forehead quite round, just above the ears, then taking hold of the skin with their teeth, they tear off the whole hairy scalp in an instant, with wonderful dexterity.'

Thacher's book does bring out one thing in regard to the medical service. Despite lack of military status, the medical officer's social position was quite satisfactory.

We are fortunate in possessing the 'Journal of Isaac Senter, Physician and Surgeon of the Troops detached from the American Army encamped at Cambridge, Mass., on a secret Expedition against Quebec, under the command of Col. Benedict Arnold, in September, 1775.'¹ This ill-fated expedition, one of the most heroic features of the entire American Revolution, was undertaken with little preparation and launched in the face of natural

¹ 8°, pp. 40. Philadelphia: Published by the Historical Society of Pennsylvania, 1846.

difficulties insuperable by any but heroes. *Half of the command of eleven hundred were not heroes and turned back in six weeks after great hardships, but before the greater ones had been faced. The other half went on through a northern wilderness on a beginning allowance of half rations of flour and partly spoiled salt pork, later quite without food and narrowly escaping starvation. Without tents or shelter, with loss of all camp equipment and most ammunition, it won through snow and cold to Quebec, with four rounds of ammunition per man left for the attack. The attack failing, a siege was kept up for months in the face of great discouragement. General Montgomery was killed, Colonel Arnold wounded, General Thomas died of smallpox. Men unable to proceed on the way up had to be left to die in the wilderness. Senter lost his instruments and medicines, but saved a pocket lancet and was still able to let blood. Pneumonia, pleurisy, and smallpox he treated without medicines, possibly better than had these been present. Smallpox inoculation he did on a large scale, noting that in May, 1776, 'I generally inoculated a regiment at a class, who had it so favorable as to be able to do garrison duty during the whole time.' It is a great story, with Arnold and Morgan as heroes, and Isaac Senter one of whom the Medical Department can be proud.

In 1777 there was published, 'by order of the Board of War,' a small pamphlet of 'Directions for Preserving the Health of Soldiers,' by Benjamin Rush. Fairly indicative of its generally theoretical nature is the following: 'It is a well-known fact, that the perspiration of the body, by attaching itself to linen, and afterwards, by mixing with rain, is disposed to form miasmata, which produce fevers.'

James Tilton, physician and Surgeon General in the War of 1812, in 1781 wrote as follows:

'The flying camp of 1776 melted like snow, in the field: dropped like rotten sheep on their straggling rout home, where they communicated the camp infection to their friends and neighbors, of which many died.

'... After the battles of Brandywine, Redbank, etc., a general hospital was established in the college of Princeton, where I was a prescribing surgeon. The sick and wounded, flowing promiscuously without restraint into the hospital, it soon became infectious and was attended with great mortality. I caught the jail fever ¹ myself and narrowly escaped with my life. After a tedious illness, I got leave to return home for the recovery of my health. . . . At Bethlehem was another hospital, and I found it convenient to rest there a day or two. During my stay it was natural to inquire into the state of this hospital. . . .

'I was answered that the malignancy and mortality of Princeton hospital bore no comparison with theirs: that at Bethlehem not an orderly man or nurse escaped, and but few of the surgeons: that one surgeon, Jos. Harrison, a fine young fellow, distinguished for his assiduity, had died . . . forty of that regiment had come to this hospital. He then asked me how many I supposed would ever join the regiment. I guessed a third or a fourth part. He declared solemnly that not three would ever return; that one man had joined his regiment; that another was convalescent and might possibly recover: but that the only remaining one besides was in the last stage of the colliquative flux and must soon die. I was obliged to acknowledge the hospital at Bethlehem had been more fatal than that at Princeton.' ²

For a general idea of the better sort of regimental medical practice of the Revolutionary period, we must resort to a British text 'The Duties of the Regimental Surgeon,' etc., by R. Hamilton, M.D. (London, 1787), and to the small volume published in Philadelphia in 1776, which, according to Brown's 'History of the Medical Department,' was the only work accessible to American

¹ This jail fever was the typhus of that day, which in turn was much of it typhoid. What Tilton discussed was probably mostly typhoid fever, as he says: 'If I ever saw the petechiæ, so much dwelt upon by Pringle and Monro, I have forgotten all about them.' This indicates that he was not familiar with exanthematic typhus.

² *Economical Observations on Military Hospitals and the Prevention and Cure of Diseases Incident to an Army.* By James Tilton, M.D. Wilmington (Del.): Printed by J. Wilson, 1813.

army surgeons. This volume contained two treatises: (1) 'The Diseases Incident to Armies, with the Method of Cure,' a translation of Van Swieten, of 164 small octavo pages; and (2) 'Plain, Concise, Practical Remarks on the Treatment of Wounds and Fractures, to which is Added an Appendix, on Camp and Military Hospitals,' of 110 pages, by John Jones, M.D., Professor of Surgery, in King's College, New York. The book was printed by Robert Bell, in Third Street, Philadelphia. It is unfortunate that we have no account of American regimental medical service comparable to Hamilton's account of the British, but in view of the much older organization of the British Army, the difficulties Washington had with the army under him, and the general low state of medical education in America at that time, we may be reasonably sure that the American medical service rarely equaled and probably never excelled the British. Hamilton laments that unqualified men were appointed surgeons's mates in the British service, some with no better training than was afforded by a few months of work in an apothecary's shop, or 'even a common soldier from the ranks, after assisting the surgeon of the regiment, in spreading plaisters, for some time, and in the capacity of orderly man, was appointed mate thereof, on a vacancy that soon happened; and, if he had outlived the surgeon, or a vacancy happened from promotion, or other causes, would, no doubt, have succeeded him in office.' ¹ The pay of the surgeon, after deduction of fixed stoppages, was a guinea a week. In the American Army it was fixed by Congress in 1779 at one and one third of a dollar per day. As this was Continental money, the sum was not munificent. 'In the line of actual subordination the surgeon ranks not only below the youngest ensign, but the quartermaster and adjutant; and the mate again below the surgeon.' Important

¹ From Thacher's *American Medical Biography* (Boston, 1828), we learn that Josiah Bartlett, who afterward became Governor of New Hampshire, was appointed surgeon's mate at the age of sixteen years, and that John Thomas, of Massachusetts, was appointed surgeon's mate at the age of seventeen, and upon the resignation of his father, who was regimental surgeon, he became surgeon at the age of eighteen, in 1776, and served as such throughout the war.

among the duties of the surgeon and mate was attendance at floggings, 'to watch the sufferings of the delinquent attentively, and to order him from the halberts whenever he is thought in danger.'

Every regiment had a hospital for its sick, provided that a house for that purpose could be procured. The British Government allowed thirty pounds per year for the maintenance of this hospital. Troops were billeted in public houses and were regarded by landlords as a tax and a nuisance, and were lodged as poorly as possible. 'The truth is, many a prisoner in his cell is better lodged.' This is eloquent, if we recall the descriptions of British prisons of that day. In such wretched conditions the soldier had to lie and be treated when sick, if there was no hospital, as was often true. The sick attendants were usually 'orderly men,' detailed for a day at a time. 'For the most part, he is only anxious for the expiration of the time he is obliged to remain on duty, which is twenty-four hours.' As for the regimental hospital, 'I have seen it consist of two small rooms, one above another, and in each of these twelve men, though the room did not measure above twelve feet by fifteen, the place being almost one continued bed, without spaces between, instead of distinct beds. Into this crowded spot only the worst cases were sent. Some chronic cases, some acute fevers, punished men with backs suppurating and emitting a smell intolerable even to people in health.' Some regimental hospitals had a nurse, or housekeeper, who was a woman. 'Since a great part of the business this servant undertakes is to dress the patient's meat, to prepare drinks for the sick, and to wash for them (for they should do this at a stipulated price) a woman is always to be preferred, where a choice can be made.' Her pay was sixpence a day. It was considered desirable that one or two orderlies be detailed to assist her. The regimental surgeon was bothered then, as before and since, by 'the venereal disease. It is oftentimes no sooner removed than it is again contracted. Among soldiers it is so prevalent that no reproach follows it, either from their comrades or from many of their officers.

While this is the case, all hopes of reformation are shut out. Yet, I would venture to give it as my opinion that some punishment should follow it.' Congress, as we shall see, attempted to inflict punishment and raise funds at the same time.

All in all, the 'Duties of the Regimental Surgeon' affords some seven hundred and twenty pages of melancholy reading. Let us turn to Van Swieten and his 'Diseases Incident to Armies.' The enumeration of the diseases considered is sufficient for this place. They are: 'Coughs; Sore Throat; Pleurisy; Peripneumony; Rheumatism; Intermitting Fevers, spring and autumnal; Quartan Fevers; Jaundice; Dropsy; Vomiting; Cholera Morbus; Diarrhœa; Dysentery; Inflammation of the Intestines; Phrenzy: Hæmorrhage of the Nose; Continued Fever; Scurvy; Lues Venerea; Itch; Worms.' A perusal of this list speaks volumes, to the medical man of the present, in regard to that day's knowledge of medicine. Diagnosis, pathology, epidemiology, hygiene were almost equally vague. Let us pass on to John Jones's 'Treatment of Wounds and Fractures,' the Revolutionary surgeon's textbook on military surgery. His book of one hundred and fourteen small octavo pages, first published in 1775, was the only medical book by an American author published in the United States up to that time, a fact which justifies a reproduction of its title-page, despite the fact that it was almost entirely a compilation from the work of English writers, and of original matter contained only one case report. John Jones was no fool and there is good sense in his book, but his ideas of infection in surgery were as vague as those of Van Swieten. Hence we find the following in regard to inflammation: 'Irritation and pain are at all times its immediate or proximate causes; and in most cases, if we can prevent pain we shall proportionably prevent, or at least lessen the succeeding symptoms of inflammation. This is to be done only by the immediate exhibition of sudorific anodynes. Bleeding, gentle laxatives, warm baths and soft cataplasms to the parts affected, will all contribute towards this most desirable purpose, and should never be omitted; yet without premising opium, they will seldom avail in preventing

inflammation.' We also find that 'About the fourth day, sooner or later, a white, pinguious, equal matter, called pus, is generated in the wound; and this produces very happy effects, by separating the lacerated vessels and extravasated fluids from the sound parts, which then grow up afresh. Hence laudable pus is esteemed by Surgeons the best of signs.' Jones had a justifiably bad opinion of large hospitals, as being places and causes of death. He therefore favored the use of regimental hospitals only, with large space for each patient and liberal ventilation, with fire-places and 'the utmost possible cleanliness,' an ideal regimental hospital rarely, if ever, seen.

None of these quotations or citations is made in a fault-finding spirit, but rather to indicate the military medicine of that day. As medicine it was up to date; as a part of military life and art it was not antiquated. Hudleston tells us¹ that General Gage made absolutely no provision for wounded at Bunker Hill. 'It did not occur to him that you can not make an omelet without breaking eggs and that a battle is necessarily attended by casualties.' An eye-witness wrote: 'It is impossible to describe the horror that on every side presented itself — wounded and dead officers on every street; the town [Boston], which is larger than New York, almost uninhabited to appearance, bells tolling, wounded soldiers lying in their tents and crying for assistance to remove some men who had just expired. So little precaution did General Gage take to provide for the wounded by making hospitals, that they remained in this deplorable situation for three days; the wounded officers obliged to pay the most exorbitant price for lodgings.'

Under such conditions as these few quotations outline, begins the history of the Medical Department of the United States Army.

The force gathered at Boston by the colonists, after the affair at Lexington, was a general uprising of the populace, including doctors as well as farmers and tradesmen. These doctors utilized

¹ F. J. Hudleston: *Gentleman Johnny Burgoyne*. Bobbs-Merrill Company, 1927.

PLAIN CONCISE
PRACTICAL REMARKS

ON THE TREATMENT OF
WOUNDS AND FRACTURES;

TO WHICH IS ADDED, A SHORT

A P P E N D I X

ON

CAMP AND MILITARY HOSPITALS;

PRINCIPALLY

Designed for the Use of young MILITARY SURGEONS,
in NORTH-AMERICA.

By JOHN JONES, M. D.
Professsor of Surgery in King's College, New York.

NEW - YORK:

Printed by JOHN HOLT, in Water-Street, near the
Coffee-House.

M,DCC,LXXV.

John Reoman Jones M.D.

their knowledge and skill in such ways as they saw for advancing the cause of liberty. Dr. Joseph Warren was present as a major general of militia; he and other medical men fought in the line. Warren was killed at Bunker (Breed's) Hill. There was no staff, but after the battle of Breed's Hill a hospital was established in Cambridge 'in several commodious homes' with Dr. John Warren in charge.

Three other hospitals were soon established, one at Watertown, one at Roxbury, and a third for smallpox cases. The Provincial Congress of Massachusetts legislated in regard to these on July 1, 1775, fixing the medical personnel for a hospital at two surgeons and two surgeon's mates, and the medical officers for a regiment at one surgeon and two mates, to be appointed by the colonel of the regiment. The pay of hospital surgeons was fixed at eight pounds per month and that of mates at four pounds. Massachusetts' enactments could apply, however, only to Massachusetts troops, and as forces came from other colonies a general head and general legislation became necessary.

The Colonial Congress chose Washington to be Commander-in-Chief and passed an act for the appointment of general officers and officers for a general staff, but the bill made no provision for a hospital or medical department. Washington's first inspections convinced him of the need of this, and on July 21st he wrote to the President of Congress: 'I have made enquiry into the establishment of the hospital, and find it in a very unsettled condition. There is no principal director, nor any subordination among the surgeons; of consequence, disputes and contentions have arisen and must continue until it is reduced to some system. I could wish it was immediately taken into consideration, as the lives and health of both officers and men so much depend on a due regulation of this department.' Two days before this, however, Congress had appointed a committee to consider the method of establishing a hospital, and on July 27th it reported a bill which was agreed to.

It provided for the establishment of 'an Hospital' for an army

of twenty thousand men, with a personnel of one Director General and Chief Physician, four Surgeons, one Apothecary, twenty Surgeon's Mates, one Clerk, two Storekeepers, one Nurse for every ten sick, and laborers occasionally as needed. The Director was placed under the orders of the Commander-in-Chief. Dr. Benjamin Church of Boston was appointed Director General and was authorized to appoint the four surgeons, who, in turn, were to appoint the mates.

This legislation, although loosely drawn and quite inadequate in its provisions, was an improvement upon the previously existing state of affairs. Dr. Church, who had been a prominent man and a leading patriot in Boston, was expected to accomplish much and failed to do so. He was soon detected in what appeared to be treasonable correspondence and in October, 1775, a Court of Inquiry referred his case to Congress. He was ordered to be confined and watched, but, his health failing, he was released on bond in May, 1776. Soon after his release he sailed from Boston for the West Indies, but the ship on which he took passage was never heard from again.¹

Meanwhile, on October 17, 1775, Dr. John Morgan, of Philadelphia, had been appointed to succeed him. Morgan had served as a surgeon in the French and Indian War, had gone to London in 1760 and been a student of John Hunter's, received his degree of Doctor of Medicine from Edinburgh in 1764, and returned to Philadelphia in 1765, where he took the chair of Theory and Practice of Medicine in the new medical school which he helped found. He at once entered upon a career of prominence and leadership among the cultured and scientific people of the city. He reported to Cambridge promptly after his appointment, found the hospitals crowded and at once set to work to effect improvements, which he did speedily. Morgan was an able, conscientious, energetic, and patriotic man. Real success with that army and time was impossible. Morgan's account of his difficulties excites profound pity and sympathy.

¹ See Dr. Leary's letter, Appendix 1.

Prior to Morgan's appointment, a concentration of troops on the northern border under General Philip Schuyler had been effected, with a view to the invasion of Canada. These troops had no medicines or comforts for the sick. General Schuyler, acting on the advice of the legislature of New York, after Congress had adjourned without doing anything for him, employed Dr. Samuel Stringer of Albany to undertake the management of the Hospital. In September, 1775, Congress confirmed his action and appointed Dr. Stringer to be Director of the Hospital and Chief Physician to the Northern Department.

In December, 1775, Congress authorized the appointment of surgeons for battalions then being raised in New Jersey and Pennsylvania. Such action had not sooner been necessary, as the regiments had been supplied by the various colonies and had their own medical officers.

The winter of 1775-76 was a hard one for the army, especially on the northern border. The men were inadequately clothed and fed, lacked organization, were disheartened by their failure to take Quebec, and were very homesick. They also suffered severely from smallpox, pneumonia, dysentery, and other diseases. Inoculation was not so successful here as at Boston.

The army at Cambridge was suffering from typhus, typhoid, dysentery, smallpox, and lack of supplies. Dr. Morgan appealed to the public for dressings, bedding, etc., and evidently received them, as he later issued an address of thanks. The sick of the army on the 2d of March, 1776, numbered 2398 present and 367 absent; total 2765, out of a strength of 18,524. In April, 1776, the hospital following the army was transferred from the vicinity of Boston to New York, where it was put in good condition, but there began to be much trouble with regimental hospitals.

On July 17, 1776, Congress again legislated in regard to the hospital, increasing the number of surgeons and mates, in proportion to the augmentation of the Army, so that there should be one surgeon and four mates for every five thousand men; calling for inspections of equipment, and rendition of returns; increasing

the pay of hospital surgeons to one dollar and two thirds of a dollar a day, and giving them precedence over regimental surgeons. Regimental surgeons were also forbidden to draw upon the hospitals for any stores except medicines and instruments. These provisions the regimental surgeons resented greatly, as destructive of regimental hospitals and injurious to themselves. Their hospitals, without bedding and special food articles, were reduced to the status of dispensaries, and they themselves subordinated still further.

At about the same time, Congress elected Dr. William Shippen, of Philadelphia, to be chief physician to a 'flying camp' of ten thousand men, established at Trenton; Dr. William Rickman to be director of the Continental Hospital at Williamsburg, Virginia; and Doctor Jonathan Potts to be surgeon of the Northern Department, with the understanding that the appointment was not to supersede Dr. Stringer. The Northern Department was now much reduced by disease and desertion and in great distress for want of medicines, hospital stores, and surgeons. In the one hospital at Fort George the return for the fortnight ending July 26th showed 1497 admissions, 439 discharges, 51 deaths, and 3 desertions.

Dr. Stringer applied to Dr. Morgan for help and the latter sent him enough medicines for six regimental chests and also appointed surgeons and an apothecary for the Northern Army. This Dr. Stringer resented as an invasion of his rights. Asking permission from General Gates to go to Albany for medicines, he went to Philadelphia and complained to Congress. There was much quarreling and uncertainty as to medical affairs, and much suffering by the sick. The quarrels were settled by Congress in January, 1777, by the dismissal of both Dr. Morgan and Dr. Stringer. It later acknowledged that it had made a mistake in respect to Morgan.

Nevertheless, Morgan's 'Vindication of his Public Character,' written by himself and published in Boston in 1777, does permit the inference that, despite poor, ignorant, and undisciplined per-

sonnel, lack of equipment of all kinds, poverty, and wretched support from Congress, all of them things with which he had to bear or to contend, he might have accomplished more except for drawbacks due to his own personality. These faults were apparently two: first, an inability to delegate work, which was not wholly compensated for by the hardest of work on his own part, and second, a mistaken or too modest conception of his duties as Director General. As stated earlier, the individual regiments at first brought their own medical men, and Washington found the need at Cambridge to be for a general hospital service. Congress legislated for that, but not, as Morgan viewed the matter, for any regimental service; whereas the regiments and apparently the States, and possibly Congress itself, expected him to make provision for all medical necessities. Had Morgan boldly taken this same view and regarded himself as the one responsible for all medical service, he might have had greater support from the regimental officers, line as well as medical, and so had greater success. As it was, he regarded himself as having to do only with 'The Hospital' and not with the regiments; he was unable to furnish these with necessary supplies; the regimental surgeons thought him negligent of, and opposed to their needs and they worked against him. From their enmity arose a large part of his troubles.

Another large part came from the promotions of Stringer and Shippen, due partly to politics, possibly in part to the machinations of the two, but possibly also in part to Morgan's too great concentration on the work in his immediate vicinity, with consequent inability to look after the service of distant forces in any effective manner.

After the dismissal of Morgan and Stringer, a plan for the reorganization of the Hospital was drawn up by Drs. William Shippen and John Cochran; approved by Washington, who forwarded it to Congress; and was enacted into law without great change on April 7, 1777.

It provided for a Director General of all military hospitals in the United States, but prescribed that he should particularly

superintend the hospitals between Hudson's and the Potomac Rivers; for a Deputy Director General for hospitals to the eastward of Hudson's River: one for the Northern Department and, 'when circumstances shall require it,' one for the Southern Department. The Director General and deputies were to establish and regulate a sufficient number of hospitals, to provide medicines, dressings, bedding, furniture, proper diet, and everything necessary for the sick and wounded, to pay salaries and expenses. There were to be assistant deputy directors to superintend individual hospitals, an apothecary general for each district; a commissary of hospitals in each district, with assistants and storekeepers to provide rations and forage. A steward was allowed for every hundred sick, matrons in the same proportion, and a nurse for every ten sick, 'who shall be under the direction of the matron.' Officers and soldiers of the guard were directed to obey the directors.

There was also provision for the appointment of a physician general and a surgeon general in each district, to be appointed by Congress, and whose duty it was to superintend the practice of physic and surgery in all hospitals of the district. These seem to have been the prototypes of the Principal Consultants of the A.E.F. in 1918.

Surgeons and mates were authorized 'as the director, or deputy director general for the district, shall judge necessary.' Quartermasters were directed to supply a suitable number of covered and other wagons, litters and other necessities for removing the sick and wounded, or in case of deficiency the director or deputy director general should do so.

There was to be a physician and surgeon general for each army, to supervise regimental surgeons and mates, who might be brought to trial by court martial for derelictions. They were also to receive tents and stores for the treatment of men who could not be removed to the general hospital with safety. The law provided for daily returns of sick and wounded, to be made to the physician and surgeon general, and for monthly returns to the

Director General. The Medical Committee (of Congress) was authorized to visit, inspect and inquire into hospital affairs. The Director General and his deputies were authorized to order surgeons from hospitals to regiments and from regiments to hospitals in times of need.

It was a fine law¹ and gave the medical people a free hand, but it did not work satisfactorily. The reasons for this probably lay in the inexperience of the personnel in administrative work, in its lack of military status, in the poverty of the country and the insufficiency of means; in general the difficulties with which Washington also had to contend, and which were responsible for the conditions at Valley Forge.

Dr. William Shippen was appointed Director General, and a Physician General of the Hospital, Surgeon General of the Hospital, and a Physician and Surgeon General of the Army were appointed for each of the three Departments, while the Eastern and Northern Departments each had also a Deputy Director General. Of these appointees, Dr. Benjamin Rush in particular, enjoys to-day the greatest medical reputation of any medical man of our Revolutionary period.² He was also a leading citizen and a signer of the Declaration of Independence. He was not a good subordinate and he wrote to Congress complaining of Dr. Shippen.

'On the thirtieth of January [1778], Dr. Rush resigned his commission as Physician General of the Hospital in the Middle Department, and was succeeded by Dr. William Brown, of Virginia. He does not seem, however, to have given up the cases against Dr. Shippen, for early in March he made charges of the gravest character against that officer, accusing him of malpractice and

¹ Act of Congress, April 7, 1777.

² By virtue of his social and professional prominence, his position as teacher and his facile pen, Benjamin Rush had more influence upon American medicine and was more potent in the propagation and long perpetuation of medical errors than any man of his day. To him, more than to any other man in America, was due the great vogue of vomits, purging, and especially of bleeding, salivation, and blistering, which blackened the record of medicine and afflicted the sick almost to the time of the Civil War.

neglect in his department. These he enclosed to Washington, and on the third of April sent copies of them to Congress, which referred them to a special committee, "with power to send for persons and papers." It does not seem, however, that anything came of the reference, at least not during the year 1778. This was the last appearance of Benjamin Rush as a member of the medical corps. . . . After the War President Washington appointed him Director of the Mint in Philadelphia, an office which he held for fourteen years.¹ This indicates Washington's magnanimity, as Rush was involved in the Conway Cabal and, according to John Fiske,² an anonymous letter of complaint written by Rush to Patrick Henry and by the latter turned over to Washington gave to him early information of the efforts to supplant him by Gates or Conway. Rush died on the fourteenth of April, 1813, aged sixty-eight years.

The complaints against Shippen continued, and in June, 1779, he was accused by Dr. John Morgan, who had himself just been exonerated by Congress after a long investigation, of malpractice and misconduct in office. Shippen was later tried on these charges and acquitted, in August, 1780, but in the following January he resigned the office of Director and was succeeded by John Cochran, whose appointment was recommended by Washington. Shippen lived until 1808, one of the leading citizens and medical men of Pennsylvania.

Cochran remained Director General until the close of the war, being mustered out of the service in 1783. He settled in New York and was later appointed by President Washington to be Commissioner of Loans for the State of New York. He died of an apoplexy in 1807.

The history of the Medical Department during the Revolution includes far too much of medical quarrels and charges of incompetency. Of the four Directors General, one was tried and

¹ Brown, H. E.: *Medical Department of the United States Army*. Government Printing Office, 1873.

² *American Revolution*, II, 35.

two others dismissed. We find little in 'which to take great pride.

Early in 1778, Congress attempted both to decrease venereal disease and to provide funds to help purchase clothing, by means of the following resolution:

'*Resolved*, That the sum of ten dollars, shall be paid by every officer, and the sum of four dollars, by every soldier, who shall enter, or be sent into any hospital to be cured of the venereal disease; which sum shall be deducted out of their pay, and an account thereof, shall be transmitted by the physician or surgeon who shall have attended them, to the regimental paymaster, for that purpose; the money so arising, to be paid to the director general, or his order, to be appropriated to the purchasing of blankets and shirts, for the use of sick soldiers in the hospital.'

There is no record as to the result, which was probably *nil*. In 1780 the first Army Regulations, drawn up by Baron Steuben, the Inspector General, received the approval of Congress and were issued. The chapter relating to 'Treatment of the Sick' showed the general good sense and method which proved so helpful to the Army in other ways. It said:

'There is nothing which gains an officer the love of his soldiers, more than his care of them, under the distress of sickness; it is then he has the power of exerting his humanity, in providing them every comfortable necessity, and making their situation as agreeable as possible.

'Two or three tents should be set apart in every regiment, for the reception of such sick, as cannot be sent to the general hospital, or whose cases may not require it; and every company shall be constantly furnished with two sacks, to be occasionally filled with straw, and serve as beds for the sick. These sacks to be provided in the same manner as clothing for the troops, and finally issued by the regimental clothier, to the captain of each company, who shall be answerable for the same.

'When a soldier dies, or is dismissed the hospital, the straw he lay on is to be burnt, and the bedding well washed and aired

before another is permitted to use it. The sergeants and corporals shall every morning at roll call, give a return of the sick of their respective squads, to the first sergeant, who must make out one for the company, and lose no time in delivering it to the surgeon, who will immediately visit them, and order such as he thinks proper, to the regimental hospital; such whose cases require their being sent to the general hospital, he is to report immediately to the Surgeon General, or principal surgeon attending the army.

‘Once every week, and oftener when required, the surgeon will deliver the commanding officer of the regiment, a return of the sick of the regiment, with their disorders, distinguishing those in the regimental hospital from those out of it.

‘When a soldier is sent to the hospital, the non-commissioned officer of his squad, shall deliver up his arms and accoutrements to the commanding officer of the company, that they may be deposited in the regimental arm chest.

‘When a soldier has been sick, he must not be put on duty, till he has recovered sufficient strength, of which the surgeon should be judge.

‘The surgeons are to remain with their regiments, as well on a march as in camp, that, in case of sudden accidents, they may be at hand, to apply the proper remedies.

‘Each regiment will furnish a non-commissioned officer, to conduct the sick and lame, who are not able to march with their regiments. These men are to repair at the beating of the general, to the rendezvous appointed, where a sufficient number of empty wagons will be ordered to attend, for the reception of their knapsacks; and their arms if necessary.

‘A surgeon of each brigade, is to attend the sick belonging to it.

‘The commanding officer of each battalion, will inspect the sick before they are sent from the battalion, in order that none may be sent but those who are really incapable of marching with their regiments.’

Until February 7, 1781, the medical affairs of the Army were regulated by the Congress itself or by its ‘Medical Committee.’

The management was inexperienced, without precedents, always guided by principles of economy, and generally unsuccessful, a fact indicated by the frequent legislation and reorganizations. There is little else in the remaining record. In February, 1781, the Congress appointed a Secretary at War, a Secretary of Marine, and a Superintendent of Finance, all responsible to it. General Lincoln was appointed Secretary at War, and it was directed that reports theretofore sent to the Medical Committee should be sent to him. Congress continued to legislate in regard to the Hospital, however, providing for seniority promotion, changing pay and ration and forage allowances and providing methods of accounting, until the end of the war.¹ Thereafter the military establishment was reduced rapidly. In September, 1783, the Commander-in-Chief was authorized to grant furloughs to all of the medical staff whose services were no longer needed, which was equivalent to disbandment of the Hospital. In June, 1784, it was enacted:

'That the Commanding Officer, be, and he is hereby directed to discharge the troops now in the service of the United States, except twenty-five privates to guard the stores at Fort Pitt; and fifty-five to guard the stores at West Point, and other magazines; with a proportionate number of officers; no officer to remain in service above the rank of Captain, and those privates to be retained who were enlisted on the best terms; *Provided*, Congress before its recess, shall not take other measures, respecting the disposition of those troops.'

Post-bellum economy is no new thing; it existed in 1784. The Government then depended on the States to furnish, upon call, such forces as might be necessary for the protection of the frontier. A call for such forces was issued in June, 1784; for seven hundred men, to 'take possession of the western posts as soon as evacuated by the troops of his Britannic Majesty; for the protection of the northwestern frontier; and the guarding of public stores.' These

¹ See Owen, Colonel William O.: *Medical Department, United States Army (1776-1786)*. 8°. New York, Paul Hoeber, 1920.

troops were furnished by Connecticut, New York, New Jersey, and Pennsylvania, and were organized into a regiment of infantry and two companies of artillery to serve twelve months. One surgeon and four mates provided the medical attention. The force was increased in October, 1786, to 2040 officers and men, but these were militia. It was reported by a committee appointed to close up the Revolutionary Department of War that the total number of troops in service in October, 1788, was 595, distributed at West Point, Springfield, and several blockhouses in western Pennsylvania and what is now Ohio. The medical officers were furnished by the States furnishing the troops.

In April, 1789, Washington was inaugurated President. Henry Knox was his Secretary of War. The Indians on the western frontier were troublesome, and in September Congress authorized the organization of seven hundred men into a regiment of infantry and two companies of artillery, all to be stationed on the frontier. One surgeon and four mates were provided. In April, 1790, this organization was supplanted by another and larger one, but the Indians having defeated it on the Miami River, on October 19th and 20th, the President was authorized to employ troops 'under the denomination of Levies,' not exceeding two thousand rank and file; with a suitable number of commissioned officers and also 'to engage from time to time, such additional number of surgeon's mates, as he shall judge necessary.' With this force General St. Clair, who had succeeded Harmer, marched against the Indians, but on November 4, 1791, he was surprised and defeated near the source of the Maumee, with a loss of more than six hundred killed and two hundred wounded. Among the killed was Dr. Victor Grassin, surgeon's mate. The term of service of the levies expired in the fall of 1791. In March, 1792, an act was passed reorganizing the military forces. The bill provided for two permanent regiments of infantry and three additional regiments for the period of three years. The President was authorized to organize the force as might appear most proper, 'diminishing the number, or taking from one corps and adding to another.'

The whole force was formed into a 'Legion' under command of a major general, with a staff, among others a 'Surgeon of the Legion' as chief medical officer. The Legion was divided into four sub-legions, each of 1280 rank and file, to be commanded by brigadier generals. Each had a surgeon and three surgeon's mates, one for each battalion. Richard Allison was appointed Surgeon of the Legion.

General Anthony Wayne led the Legion against the Indians, spent the year 1793 in building forts and roads, and in August, 1794, defeated the Indians at Maumee Rapids. By an act of May 7, 1794, a regiment of artillerists and engineers was organized. It was allowed one surgeon and four mates. This year trouble arose with the British in regard to the western posts which they were still holding, about shipping and other matters, and war threatened. Ultimately it was avoided by the Jay Treaty. However, the enlistments of the Legion were near expiring and an act of March 3, 1795, provided for another reorganization on similar lines, but it was apparently not carried out, for in February, 1796, Secretary Pickering called attention to the military needs and in May Congress passed another act of reorganization. The regiment of artillerists and engineers was retained, and the infantry force fixed at four regiments, each to have one surgeon and two surgeon's mates, 'provided always: that the President of the United States may at his discretion, appoint an additional number of surgeon's mates not exceeding two, and distribute the same, according to the necessity of the service.' On April 27, 1798, a second regiment of artillerists and engineers was organized to serve for five years. It was given one surgeon and two mates.

War with France now threatened, and in May the President was authorized to raise a provisional army of ten thousand men, with the necessary general and staff officers, among them a physician general with the rank, pay, and emoluments of a lieutenant colonel. In July the regular army was further increased (on paper) by twelve regiments of infantry and one of dragoons.

Under the May act Dr. James Craik was appointed Physician General. Medical officers were appointed for the regiments but there was no provision for a Hospital. In December, 1798, Secretary of War McHenry, himself a surgeon during the Revolution, called attention to this defect and on March 2, 1799, Congress passed an 'Act to regulate the Medical Establishment,' making good the deficiency. Before the troops called for by these acts were well organized, it became evident that there would be no war, and in May, 1800, Congress passed a bill to discharge, by the fifteenth of June, all the troops raised for the increase of the Army, except the general and other staff officers, the engineers, the inspector of artillery, the inspector of fortifications, two troops of dragoons, the two regiments of artillerists and engineers and the first four regiments of infantry.' Under the provisions of this act the Physician General was mustered out of service, as were all medical officers except six surgeons and twelve surgeon's mates, the number of mates being further reduced to seven by December, 1801, by the failure to fill vacancies. By act of March 16, 1802, the Military Peace Establishment was fixed at one regiment of artillery and two of infantry, but the number of small posts established caused Congress to provide for two surgeons and twenty-five surgeon's mates 'to be attached to garrisons or posts and not to corps.' From 1806 to 1808 there were impositions by Great Britain and the Army was increased by eight regiments.

There is an almost complete lack of reference to medical affairs from 1800 to the War of 1812, but the following from the Medical Repository of 1811 (page 85) is interesting:

'Great mortality was suffered by the detachment of the army encamped on the bank of the Mississippi, below New Orleans. The troops were ordered to a place about fifteen miles to the south-east of the city. The ground selected by the quartermaster was low and swampy. A spot was cleared in the forest for their reception. Frequently, after a shower of rain, the camp was wet and muddy. In the rear were puddles of stagnant water. A luxuriant crop of vegetables grew in these, and putrified in the course of

the season. When the heats came on during the summer, the exhalations were rank and offensive.

‘Quartered on such damp ground, and breathing such a noxious atmosphere, the men soon became sickly. And this predisposition to disease was the more serious, inasmuch as the officers and soldiers came chiefly from more elevated and northerly climes, and had never been seasoned to southern service.

‘The situation of the army was the more calamitous, by reason of an omission to organize the medical staff, and to establish a regular hospital department. They who fell sick were not furnished with the usual accommodations. There were not even medicines in the camp to be dispensed to those who stood in need of them. Generally destitute of nurses, remedies, and attendance, the diseased recovered by strength of constitution or sunk under their complicated miseries.

‘But their condition was further aggravated. The beef and pork of their rations were remarked to be often in a corrupting and stinking state. Whether the salt had been too sparingly applied to them, or was of a weak and faulty quality, is not finally settled; but so it was, the meat was disgusting and unwholesome.

‘Fresh provisions were seldom afforded to the men; and the few that were issued were poor and scanty. There seemed to be no regular organization of the commissary’s department.

‘As might have been predicted, the men became diseased, and died so rapidly, that orders were given to quit the station, and move the survivors to the higher country, near to Natchez. The prevailing forms of disease in the camp were diarrhœas, dysenteries, remitting and intermitting fevers. In process of time, also, the scurvy mingled with the other maladies. This scorbutic diathesis manifested itself by swelled gums and loosened teeth. The soldiers, as surgeon Cutter declared to Dr. Mitchell, could frequently extract sound teeth from their gums with their fingers. Ulcers broke out in the mouth, tonsils and throat, of a most malignant character; and ate away all before them. The cheeks have been sometimes perforated quite through by this destructive

ulceration; and even the large blood-vessels of the neck corroded so as to discharge their contents, and terminate life by sudden hæmorrhage.'

Early in 1812 it was apparent that war was imminent. Congress was busy devising means to carry it on, providing for an increase of ten regiments of infantry, two of artillery and one of light dragoons. Each of these new regiments had one surgeon and two mates. There was also provision for the appointment of 'such number of hospital surgeons and mates as the service may require.' This was the medical provision for the War of 1812. Dr. James Mann, whose 'Medical Sketches' constitute the principal existing record of medical activities in that war, was ordered to superintend the Medical Department of the Northern Army. He wrote:

'The mere organization of hospitals was the least perplexing part of duty. The illy defined powers with which the hospital surgeons were invested, even in their own department, subjected them to many disagreeable interferences of the officers of the line. Collisions will always exist between officers of different departments of an army, when their several powers and duties are not explicitly pointed out. Officers tenacious of authority, assume as much as may be implied by rules and regulations. In addition to multiplied embarrassments, the various duties attached to the office of hospital surgeon with those merely professional, was always so pressing, that little time was allowed to record particularly the diseases and medical transactions of the army, as they occurred.'

William Beaumont gives us in his diary a vivid picture of battle and battle surgery in 1812:¹

'Sept. 27, 1812. Sailed into harbor (York Town) and came to anchor a little below the British Garrison. We now filled the boats and effected a landing, though not without some difficulty and the loss of some men. The British marched their troops from the Garrison down the [hill] to cut us off in landing, and then they

¹ Jesse S. Meyer: *Life of William Beaumont*.

had every advantage. They could not effect their [plan]. A hot engagement ensued, in which the enemy lost nearly a third of their men and were soon compelled to quit the field, leaving their dead and wounded strewn in every direction. We lost but very few in the engagement. The enemy returned into garrison, but from the loss sustained in the 1st engagement, the undaunted courage of our men, and the brisk firing from our fleet into the Garrison with 12- and 32-pounders, they were soon obliged to evacuate it and retreat with all possible speed. Driven to this alternative, they devised the inhuman project of blowing up their Magazine (containing 300 Bbls. powder), the explosion of which, shocking to mention, had almost totally destroyed our Army. Above 300 were wounded, and about 60 killed dead on the spot by stones of all dimensions falling like a shower of hail in the midst of our ranks. The enemy had about 20 killed and wounded by the explosion, tho the main body had retreated far out of the Garrison. After this sad disaster our Army marched into the Garrison, hauled down the British coat of arms (which they were too haughty to do), and raised the American Standard on its place. Our Army was about 1,500 strong — Theirs about the same. Encamped in Garrison this night, mounting a guard 500 strong to secure our safety through the night. A most distressing scene ensues in the Hospital — nothing but the Groans of the wounded and agonies of the Dying are to be heard. The Surgeons wading in blood, cutting off arms, legs, and trepanning heads to rescue their fellow creatures from untimely deaths. To hear the poor creatures crying, 'Oh, Dear! Oh, Dear! Oh, my God, my God! Do, Doctor, Doctor! Do cut off my leg, my arm, my head, to relieve me from misery! I can't live, I can't live!' would have rent the heart of steel, and shocked the insensibility of the most hardened assassin and the cruelest savage. It awoke my liveliest sympathy, and I cut and slashed for 48 hours without food or sleep. My God! Who can think of the shocking scene when his fellow-creatures lie mashed and mangled in every part, with a leg, an arm, a head, or a body ground in pieces, without having his

very heart pained with the acutest sensibility and his blood chill in his veins. Then, who can behold it without agonizing sympathy!

'*Sept. 28th, 10 Ock. A.M.* Just got time to suspend capital operation, whilst I can take a little refreshments to sustain life, for the first time since four o'clock yesterday. Return again to the bloody scene of distress, to continue dressing, Amputating and Trepanning. Dressed rising of 50 patients, from simple contusions to the worst of compound fractures, more than half of the last description. Performed two cases of amputation and one of trepanning. 12 Ock. P.M. retired to rest my much fatigued body and mind.'

Beaumont also gives us a view of some of the hardships of campaign. 'Near the middle of November the Army moved from Plattsburgh to the Province Line, 45 Deg. North, taking no tents, and destitute of covering, save a Blanket or two, lying out in open air after marching all day through the mud and water, and thus exposed to the inclemencies of the weather for a week, encamp't in the woods. After which the army returned to Plattsburgh, and there encamp'd again in the woods without Tents or Huts the first night, which was very rainy and cold: the Second also was wet and windy. They then moved to Saranac, and encamped again in the woods, during which time the weather was very various — warm and cold, sometimes raining, sometimes snowing — the men lying upon the cold, wet ground, with only a fire before their tents, for two, three or four weeks. Whilst in this wretched and deplorable situation, the men were seized with Dysentery, Intermittents, Pleurisy, Peripneumony, Cynanche and Rheumatism, which made the very woods ring with coughing and groaning.'

The experience of the winter was far from satisfactory and in March, 1813, Congress authorized the appointment of a Physician and Surgeon General and of an Apothecary General. Dr. James Tilton of Delaware was appointed to the former position, mainly because he had published the pamphlet (dedicated to General John Armstrong, Secretary of War) from which quotations have

already been made. This pamphlet consisted of three parts, the first a wholesale condemnation of general hospitals and criticism of the existing organization of the department; the second largely a dissertation on camp infection (pollution) and its avoidance; and the third a description of his own plan for a hospital. 'In such cases [cold climates and winter seasons] the best hospital I have ever contrived was upon the plan of an Indian hut. The fire was built in the midst of the ward, without any chimney, and the smoke circulating in the midst of the ward, passed off through an opening four inches wide in the ridge of the roof. The common surface of the earth served for the floor. The patients laid with their heads to the wall round about, and their feet were all turned to the fire. The wards were thus completely ventilated. The smoke contributed to combat infection, without giving the least offense to the patients; for it always rose above, before it spread abroad in the ward. And more patients could be crowded with impunity in such wards, than in any others I have seen tried. This was the expedient I employed in the hard winter of '79, '80, when the army was huddled near Morris Town, and I was well satisfied with the experiment.'¹

This 'economical observation' was made in consequence of Tilton's belief that 'the Americans have outdone all their predecessors in the pomp and extravagance of their hospital arrangements, and have surpassed all other nations, in the destruction and havoc thereby committed on their fellow citizens.'

Morgan, in his 'Vindication,' states that he collected at New York two thousand rugs and blankets, near as many bed sacks and pillows, some hundred sheets, fracture boxes, and other useful articles, which could not have been replaced in 1777 for much less than thirty thousand dollars, 'which is equal to the whole amount of what I have ever drawn or expended for the General Hospital in the space of a twelve month, including the pay of all the officers and all the hospital expences of every kind. . . . Yet the General Hospital has had the constant charge of a number from two or

¹ Tilton: *Economical Observations on Hospitals*. 1813.

three hundred to a thousand sick and upwards to provide for and attend.' This rate of expenditure may be what Tilton called pomp and extravagance. To-day it seems niggardly and wretched to a shameful degree.

For the first time in the history of our Army, medical men were now given a uniform.

'During the month of August an uncommon proportion of the army were sick or unfit for duty. More than one-third of the soldiers were on the sick reports. The officers shared with the privates in the prevailing diseases. Half of the medical staff attached to regiments were also unable to perform their duty. Of seven surgeon's mates attached to the hospital department, one died and three had leave of absence by reason of indisposition; the other three were for a short period sick. So general was the sickness, the few remaining surgeons could not do full justice to their patients. At the time when the returns of the sick in the general hospital counted between six and seven hundred, there were only three surgeons of this department present for duty. At this period of General Boyd's command, the troops were under excellent discipline, the encampment in good conditions, and the men neat in their apparel. The general and regimental hospitals were reported during the summer months by the inspectors of the Army, "in the best possible order."' "

The following account of the condition of the Army at this time is taken from an official report of Hospital Surgeon Joseph Lovell, U.S.A., and may be found in Mann's 'Medical Sketches':

'The enemies' advance being within a short distance of the camp, the details for duty were large, and skirmishes taking place at the picquets every morning; the soldiers were for a length of time stationed at the several works for several hours before daylight; and thus exposed to the influence of a cold damp atmosphere, at the time the system is most susceptible of morbid impressions. The disease consequent to this alternate exposure to a dry hot, and cold damp atmosphere, were such as might have been expected; typhus and intermittent fevers, diarrhœa and

dysentery. A detachment of artillery, stationed at the right wing near the lake, was particularly exposed to the heat of the day, and the dampness of the night, and suffered much from typhus and intermittents. . . . These diseases, however, though severe, bore but a small proportion to the usual pestilences of our army, diarrhœa and dysentery. During two years and a half, I was on the frontiers, at every post from Buffalo to Burlington, Vermont, these complaints almost invariably absorbed all others. They were the only ones which could be called our camp diseases. All others arose from obvious or local causes, and were as common to the citizen as soldier.'

At the beginning of 1814 there were general hospitals at Greenbush, Plattsburgh, Malone, Williamsville, New York, and Burlington, Vermont, the latter bearing a high reputation. In the summer another for the troops operating on the Niagara frontier was established at Buffalo. There the wounded were taken after the battle of Chippewa.

'The battle being fought on the banks of the Niagara river, the wounded were brought up in boats to the general hospital at Buffalo. They were conveyed from the boats on Buffalo creek to the hospital, a distance of three or four hundred yards, on blankets the sides of which were nailed to poles nine or ten feet long. This formed an easy and convenient litter by which four strong men could safely convey one wounded, without exposing him to the unspeakable pain from jolts, etc., which would be the inevitable consequence of transportation by wheel carriages. Besides this advantage of the litter, when the wounded soldier was to be placed on it, it was spread smoothly on the ground, and he slipped gently on. It was then taken up carefully by the assistants, and carried to the hospital, when the patient was either assigned at once to his tent, or placed on the hospital parade ground, as the convenience of dressing required. A litter thus constructed can be easily pulled away from under the patient without pain, and is in that respect, much better than the brancard, or the wheelbarrow.

'The battle of Bridgewater, on the twenty-fifth of July crowded the hospital to excess. On the first of August it contained nearly eleven hundred patients. On the fourth of that month the enemy made a sudden attack at Black Rock, and Buffalo being threatened with capture it was thought advisable to remove the hospital to Williamsville, where one had existed the previous winter. Accordingly all who were able to be moved were sent to the latter place, and a general hospital established under charge of Hospital Surgeon Ezekiah Bull, assisted by Hospital Surgeons Thomas and Lovell. The more severe cases, to the number of eighty or ninety, were left at Buffalo, under charge of Surgeon's mate W. E. Horner. The latter was constituted the receiving hospital for the army, then at Fort Erie, and Doctor Horner was directed to retain the worst cases and send all the rest to Williamsville. These hospitals were kept filled to their utmost capacity by the operations of the army, but on the termination of the campaign by the evacuation of Fort Erie in November, that at Buffalo was closed, and the remaining sick transferred to Williamsville.

'The interest of the fall campaign at the east centered at Plattsburgh. On the first of September, the sick in the general hospital numbered seven hundred and twenty men; and as these could not be protected within the lines of works, they were, in view of the approaching fight, transferred to Crab Island, two miles distant, and placed under charge of Hospital Surgeon's mate Edward Purcell. No accommodations had been provided for them on the island, and they remained for three days exposed to the wet and cold, when Doctor Purcell determined to transport them to Burlington, which he did in open batteaux across the lake. This crowded the hospital at Burlington, to such an extent, that the ill effects of crowd poisoning were soon perceived in the increased number of deaths and the slow convalescence of many. Typhus, dysentery and diarrhœa became very prevalent.'

Dr. Henry Huntt tells more about these patients after their arrival at the hospital: ¹

¹ *Medical Recorder*, April, 1818, I, No. II, 176.

‘From the 6th to the 10th of September the sick continued to arrive at Burlington in *open boats*, and during that time we received more than six hundred and fifty into the General Hospital; a great number of them were unable to walk; and some were so reduced by disease, as to be unable to tell their names. Almost every man was affected with diarrhœa, or dysentery, and many protracted cases had run into a state of typhus fever. The General Hospital was only calculated to accommodate three hundred patients; however, by placing the others in barracks, we were enabled to give them all comfortable quarters; and the greatest exertions were made by myself, and mates, to afford them all the aid in our power. The sick men were cleansed, and put into clean beds: those who were much emaciated and worn down by disease, were supplied with cordial and nourishing diet; others with medicines. Two-thirds of them were so enfeebled and emaciated, by exposure, want of proper diet, and a long continuance of disease, that none but cordial and astringent medicines could be used. In those cases of dysentery, where the strength of the patients would bear evacuations, we generally administered small doses of calom. and ipecac.; this purge was preferred because the liver in most cases participated in the disease; after the operation an anodyne was always given with advantage. The southern soldiers were the greatest sufferers among our sick, and particularly those of the 10th regiment from North Carolina, who had lately arrived on the frontier. . . .

‘Many patients, who had been long sick, were greatly distressed with nausea and puking, likewise with frequent thin, and copious alvine discharges: (in many cases involuntary). These cases were attended with a cold skin, and feeble pulse. In all such cases we directed flannel shirts and worsted stockings to be immediately put on our patients; and gave them chalk julep, with tinctr. of kino. and laud., the infusion of galls, brandy toddy, milk punch, injections of the sulphat of zinc, mucilage, and laudanum — applied blisters freely, and at night an anodyne. In some cases, when the above remedies failed, the lime water and new milk had

a happy effect in relieving the nausea and puking: in other instances, a solution of carbonate of ammonia with laudanum, was more successful; but in many cases, all our efforts failed, and the disease could not be checked in the smallest degree. Nature appeared exhausted — a hiccup supervened, attended by cold extremities and involuntary stools, which generally closed the scene.

'*Aphthae*, and *Ophthalmia* were very distressing to many of our patients, and several of them lost an eye. Erysipelas of the face affected others; in several instances, gangrene, extensive ulceration, and death, quickly followed this affection. Some protracted cases terminated in pulmonary consumption.

'In closing this account, it gives me much pleasure to state that the great attention which was paid to cleanliness and ventilation, completely succeeded in preventing infection. The wounds generally wore the most favorable aspect, and convalescence was unusually rapid; although the wounded were placed in wards contiguous to the worst cases of disease.'

James Tilton in 1816 reported ¹ upon the diseases in the Third United States Military District, which included New York City and its surroundings, for the period of the war:

'The total amount of diseases was: Intermittent fever, 625: Remittent fever, 1256: Typhus fever, 551: Dysentery, 1269: Diarrhoea, 1945: All other diseases, 6309.'

There are no records of the medical work of our campaign of 1814-15 on the Gulf. There is no reason to doubt that the medical men of the Army during the War of 1812 were in general as capable and well informed as others of their day, that Congress was then as well intentioned and as solicitous for the welfare of the country as now, that the Army was as patriotic, that 'our cause it was just,' but medical knowledge was very deficient, the country was unprepared for war, there was no medical organization at the beginning and but little later, and the medical triumphs were no greater than the military in the North and did not nearly equal Jackson's victory in the South.

¹ *Medical Repository*, III, 407.

'A Naval Surgeon' ¹ gave a vivid account of the medical history of the British expedition against New Orleans. There was much sickness from scurvy in terrible form, dysentery, liver abscess, intermittent, remittent, bilious and ardent fever, the last including yellow fever. There were many wounded, but no description is given of the surgery. Bleeding and calomel were used as freely as by the Americans.

In 1817, Dr. Joseph Lovell addressed to General Brown some 'Remarks on the Sick Report of the Northern Division for the year ending June 30, 1817.'

In this report he argued that while bad food and bad water might cause diarrhœa, dysentery and other disturbances, he did think that 'this alone does not necessarily or even generally produce such complaints' and did not do so during the war. He considered the cause to be *undue exposure to cold and moisture*. In order to meet this danger, he recommended that soldiers be required to wear a woollen shirt, and 'to follow the advice of Doctor Franklin in not taking it off until midsummer and putting it on again the *next day*. A second article equally necessary to the end proposed is an *outer coat*. Indeed there are few citizens of any grade in this climate, who do not feel the necessity for this and who do not at any rate provide for it or a substitute, though most generally comfortably housed at those times when the soldier is most exposed. And lastly the most important circumstance perhaps of all is to enable the soldier to keep his feet warm and dry by a liberal allowance of woollen socks and laced shoes, reaching at least to the ankle.' ²

Lovell also argued for a system of Medical Police, although his paper does not describe his proposal in sufficient detail to indicate at the present time just what he meant.

The surgery of the Revolution and of the War of 1812 was minimal for several reasons. Anæsthetics were not in use and except for such blunting of sensation as could be obtained with

¹ *Edinburgh Medical and Surgical Journal*, April 1, 1816, pp. 126-44.

² The recommendation for woollen clothing had been made in 1812 by Surgeon Mann and in 1813 two woollen shirts were issued to each man.

alcohol and opium, both unreliable, the patient was fully conscious in most cases and hypersensitive to pain because of his fears. Furthermore most doctors had not dissected, and were not too strong on their anatomy, and the danger of injury to unknown nerves and vessels was far from negligible. In addition to all that, the absence of aseptic or antiseptic technic assured infection in practically all cases and made mortality high. Pus, if 'laudable,' was not regarded as pathologic or as a sign of 'infection,' which term covered such complications as erysipelas, gangrene, and secondary hæmorrhage. Thus it was that James Mann was able to boast that he had kept infection out of his hospitals by frequent whitewashing of walls and sanding of floors and by constant attention to cleanliness. He held that when patients died in foul hospitals, the surgeons were culpable.

Suggestive of the infrequency of operations is James Tilton's report of medical affairs in the Third Military District, which included New York City, for the entire period of the War of 1812.¹ Among 11,955 admissions to hospital there were but seven operations, two amputations, one injection of a hydrocele and four ligations of the saphena vein for varix, the last being an operation which did not give encouraging results. The antiphlogistic treatment, which meant bleeding, purging and salivation, was still used for wounds and Mann held that 'the more blood expended the better in wounds of the viscera, provided life is not extinguished when the hæmorrhage is stopped.'

W. E. Horner many years later wrote interestingly of his experiences in the War of 1812.² An extract suggestive of his ability to convey infection is the following: 'My fingers became so sore from incessant dabbling in water and in pus, that I could seize nothing without pain.'

Samuel Gross³ stated that the bracketed splint for compound fractures was first used in the War of 1812, but he does not cite a reference and the authority for his statement is unknown.

¹ *Medical Repository*, New Series, III, 407.

² *Medical Examiner and Record of Medical Science*, New Series, VIII and IX.

³ *A Century of American Medicine*. Philadelphia: Henry C. Lea, 1876.

CHAPTER II

1818-1861

THE Medical Department as it exists to-day dates from 1818. During the Revolution there had been an analogous organization, but it passed with the Continental Army, and until 1818, with the exception of the war scare of 1798 and the War of 1812, there was no pretence of an organized department, no surgeon general or other head for such a department. There were a few surgeons and mates serving with regiments or in posts, under the command of regimental or post commanders, but having no common organization, head or interests.

When, in 1818, Congress passed a bill reorganizing the staff departments of the Army, it provided for a Medical Department and for a Surgeon General.¹

On the strength of his service record and of the report which was mentioned at the end of the preceding chapter, Surgeon Joseph Lovell was appointed Surgeon General. From that day to this the history of the Department is unbroken; it has always had a Surgeon General, always a corps organization.

In 1821, Congress reduced the Army and fixed 'The Military Peace Establishment' at four regiments of artillery, seven of infantry, the corps of engineers and topographical engineers, with such general and staff officers as were necessary. It was further

¹ The following order of April 21, 1818, actually established the Medical Department:

General Orders.

All reports and communications connected with the Medical Department will hereafter be made to the Surgeon General's Office at Washington.

All orders and instructions relative to the duties of the several officers of the Medical Staff, will be issued through the Surgeon General, who will be obeyed and respected accordingly.

The Assistant Surgeons General will forthwith commence the inspections of the Medical Department. . . .

By order

D. PARKER
Adgt. and Inspector General

enacted 'that the medical department shall consist of one surgeon general, eight surgeons with the compensation of regimental surgeons, and forty-five assistant surgeons, with the compensation of post surgeons.'

The estimates for the Medical Department for 1822 were as follows:

Total estimate.....	\$34,988.00
Probable balance after paying all bills of 1821.....	12,000.00
Appropriation required for 1822.....	22,988.00

To this should be added the following estimate of the expenses of the Surgeon General's Office:

For clerk hire.....	\$1,150.00
Wood (15 Cords at 6 dollars per cord).....	90.00
Stationery.....	150.00
Printing blanks, etc.....	100.00
Contingencies.....	50.00
Total.....	\$1,540.00

Surgeon General Lovell called for quarterly reports of sick, with remarks relative to the nature and symptoms of the complaints reported, the treatment adopted and the medicines and stores most in demand, together with a diary report of the weather, observations upon the medical topography of posts, the climate, prevalent diseases and their probable causes. In 1840 there was published a statistical report, compiled from these records for the period January 1, 1819 to January 1, 1839. A few extracts from it give a picture of the Army life and the medical officer's work at that time:

'1820 — In the northern division, in the first quarter more than one-half of the deaths occurred at Fort Mifflin and St. Peter's. . . . The number of men reported at Camp Missouri on the first of January was 788, and at St. Peter's 228, making an aggregate of 1016. The total of cases reported for the quarter at these two points was 895; of these 503 were of a scorbutic character, and the number of deaths from this cause was 168. . . .'

Surgeon Thomas G. Mower was directed to submit a report upon the outbreak of scurvy at Council Bluffs, and he wrote, in part, as follows:

'It may be proper to premise that the general character of the report required supposes me possessed of information which in no wise pertains to my department, and for which I have never been clothed with authority to ask, much less to demand. With the exception that issues of provision fell under my inspection, it is obvious that my knowledge of supplies, belonging to the Quartermaster's and Commissary's Department, is for the most part casual and unofficial. To remedy this embarrassment, I addressed a note to the commanding officer of the regiment, requesting him to afford me information upon several subjects with which I am imperfectly acquainted. To this note I have received no answer. . . .

'The 6th Regiment of Infantry, previously to taking up its march for the Missouri, had been cantoned at Plattsburgh for nearly three years, where it had experienced much of the "gay delight" of a military life with few of its hardships or privations. . . . The corps left Plattsburgh on the 20th of March, and arrived at Pittsburgh the 1st of May. At this place it halted one week, when it was embarked on board transports for St. Louis. The confinement on board the boats during our passage down the Ohio, together with the use of river water, which was extremely turbid, added considerably to the sick list.

'On our arrival at Belle Fontaine [June 8], the men appeared somewhat enfeebled. . . . On the evening of July 4th, the regiment was again embarked on board of three steamboats and four barges, destined for the Council Bluffs.

'The narrow channel of the Missouri at low stages of water, combined with its frequent and sudden bends, precludes in a great measure the use of sails. In propelling the barges, the cordelle and setting poles form the principal dependence. This mode of ascending the river requires of the navigator the most active and incessant exertions: while the severity of his labors is

not a little aggravated by being frequently compelled to plunge into the water. After the most persevering exertions, the several companies composing the regiment reached the place of destination between the 3d of October and the 14th of November. To the failure of the steamboats this dispersed state of the regiment is to be attributed. . . . Early in October, the ground having been surveyed and laid off, the regiment commenced the erection of its barracks. At this period only five companies out of eight had arrived. The position selected for our cantonment was surrounded by a thick grove of poplars — a species of timber known in this country by the name of *cotton-wood*. The principal part of the logs and plank used in the construction of the barracks was procured in the immediate vicinity. The covering (clap-boards) for one-half the rooms, the stone for the fireplaces, and the lime were transported by water the distance of ten or twelve miles. The remaining rooms, including the storehouses, were covered with shingles or boards procured near the cantonment. Fifty eighteen-foot rooms were erected for the regiment, exclusive of the storehouses, workshops, etc. The barracks were constructed with shingle roofs, having a perpendicular height of 9 feet in front and 18 in rear. . . . The men moved into their barracks at different periods during the month of December, although many of the rooms were still deficient in floors, bunks, doors, etc. The regimental hospital was prepared for the reception of the sick about the 20th of the same month. The latter part of December and the whole of January proved excessively cold, the mean for the latter month being 8 deg. 62 min. . . .

‘The state of our subsistence had long been reviewed with concern. Fresh beef, which had been issued to the troops since their arrival, in the usual proportion, was in the latter part of January restricted to the use of a few hospital patients. The country not abounding in game and the regiment having few expert hunters, little advantage was derived from the chase. The important articles of beans, peas, and vinegar, contemplated to have formed component parts of the ration, failed altogether. Salted pork and

beef, bacon, flour and Indian corn constituted the substantial part of the ration. By far the greater part of the meat was decidedly in a putrescent state, and absolutely unfit to issue; the smell and taste both rejected it with disgust. The flour, although less exceptionable than the meats, and originally of fine quality, had become musty previously to its issue. The corn, which was furnished in the proportion of two pints to six rations, was soon thrown aside as a drug. Deprived of vegetables and the usual condiments of the table, the repast of the soldier was, at the same time, deficient in nutriment, unpalatable and unwholesome.

'The medical supplies of the regiment, although sufficient in quantity for ordinary seasons, were of a very inferior quality, and by no means calculated to meet the present exigency.

'Previously to the appearance of scurvy, the men had been much enfeebled by dysentery and pulmonic inflammations, and were consequently rendered more susceptible of other ailments. The former disease commenced its attack soon after their arrival, and raged with violence till the close of the year. It was then succeeded by inflammatory affections of the lungs, which prevailed with little abatement 'till the latter part of January. Early in this month (January) a scorbutic taint was perceptible in some of our patients who were laboring under other diseases. At the first the cases were mild, and appeared to yield, in some measure, to treatment. During the whole of this month, it was noticed that the recovery of our cases was peculiarly slow and precarious: in many cases, after the acuteness of disease had been subdued, the sufferer continued to languish and decline. Early in February the progress of scurvy had become alarming: its baneful influence was extending to every form of disease. The situation of the command had assumed a serious aspect. Most of the exciting causes still existed, while the means of relief were beyond our reach. . . .

'We regret to acknowledge that the firmness of the American soldier should have been for a moment shaken by any concurrence of circumstances. We cannot conceal the fact, however, that during the prevalence of that loathsome malady which afflicted

our garrison, gloomy foreboding were depicted on many a countenance. . . .

‘On the 23rd of February, the commandant, feelingly alive to the interests of the soldier, summoned together a board of war to deliberate on measures for the relief of the command. Of the results of those deliberations, I am at present ignorant. On the 25th of the following month, 70 scorbutic patients belonging to the 6th Regiment were embarked on board of keel boats, under the charge of Surgeon’s mate Nicoll, destined for Fort Osage. At this place it was believed that they would more speedily obtain a regimen adapted to their condition.

‘On the removal of these men, we had nearly 100 patients left, suffering under the influence of the same disorder. During the first week of April, the weather proving favorable, we moved a large proportion of our sick from the Cantonment, and located them on a small stream, under tents, about three miles distant. Fortunately, at this period, wild vegetables began to shoot up. These powerful remedies, combined with mild weather, pure air and change of scenery soon banished the demon Scurvy, and restored its victims to health and strength. . . .

‘Among the vegetables first discovered, the most esteemed for its remedial virtues, was the wild onion, a very diminutive bulbous root, not larger than a nutmeg.’

In the third quarter of 1820 there was much sickness, especially in the South, and the following interesting remarks by Dr. Merrill, Surgeon’s Mate of the 8th Infantry, on the treatment of yellow fever are quoted:

‘The first three cases proved fatal, and in them the treatment was nearly the same as in bilious remittent of the usual type. In the succeeding cases, a more energetic plan was pursued. Venesection was performed *ad deliquium*: to produce this effect, 30 and 36 ounces were in some instances taken. From 15 to 20 grains of calomel, with an equal quantity of jalap, were then administered with cooling mucilaginous and acidulated drinks. This was immediately followed by calomel, every hour, in doses of 2 or 3

grains, combined with a sufficient quantity of opium to prevent a cathartic effect. At the same time mercurial friction was employed without reference to quantity. Nausea and vomiting were generally relieved by aqua carb. ammon., in doses of 30 to 40 drops. As the patient invariably complained of a burning acid taste in the matter vomited, I was led to the use of alkalies, instead of acids, in the latter stages of the complaint. To alleviate this symptom, the ol. terebin. was in some cases used, but with less beneficial effects.

'After this treatment was adopted, not a single case proved fatal. In four or five days, a profuse salivation was commonly induced, which always rendered the patient safe. As soon as practicable after the arrival of this detachment (recruits, on August 20th), sixteen ounces of blood were taken from the arm of each man, and a large dose of calomel and jalap administered. The desired effect being produced, none were violently seized afterward.'

In the discussion of the diseases of 1820 there is also a long description of 'bilious remitting fever' at Fort Scott, Georgia, a description too long to quote, but one which makes seem tame and mild the worst malaria seen in the Philippines or Panama. At first one is a bit surprised that no temperatures are quoted, but merely such phrases as 'an intolerable heat is diffused over the superficies of the body,' 'the skin is dry and parched,' 'the tongue is parched and constricted,' etc., but a moment's reflection brings to mind the fact that the clinical thermometer was not yet in use.

Thomas Lawson, later Surgeon General, himself wrote on the treatment, as follows:

'In prescribing for this *bilious remitting fever*, the therapeutic means have been as various as its forms, and the several grades of each modification. . . .

'In the inflammatory form of the disease, it is absolutely necessary to abstract from 12 to 20 ounces of blood. As a general rule, I usually administer on the first day an emetic, and on the second

a cathartic: and thenceforth adopt means to procure daily evacuations, a result not easily effected in consequence of the extreme torpor of the intestinal canal. With a view to restore the healthy function of the skin, and to maintain the bowels in a soluble state, I give, every 3 or 4 hours, a powder composed of nit. potassae, ant. tart., and submur. hydrg. Cooling acidulated drinks, and the application of cold water by effusion, have proven very useful remedies; whilst the application of blisters is frequently required during the progress of the malady. . . .

‘In the event of the stomach’s being so irritable as to reject everything, I administer copious draughts of warm water or chamomile tea, and afterwards a cordial anodyne. The irritability being thus allayed, 15 or 20 grains of calomel can be given on the following day with advantage. The subsequent treatment will depend upon circumstances.

‘In the *last quarter* of the year, the number of deaths in the northern division was 26, and in the southern 142. At Fort Scott and Baton Rouge, those two most deadly positions, the mortality was extraordinarily great. In the consolidated 7th Regiment of Infantry, consisting of 760 men, there were 769 cases of indisposition, a majority of them malignant diseases, and 32 deaths. At Baton Rouge, in a command of about 375, the cases of disease were 553, and the deaths 38.’

1821 — First quarter:

‘The southern division was unusually healthy, the total number of deaths being 42: of which 8 occurred at Baton Rouge in a command of 372 men, with 347 sick: 11 at Fort Gadsden, on the Appalachicola River, in a battalion of 250 Artillery, with 296 sick: and seven at Fort Scott, in the 7th Infantry, 750 men strong, with 541 cases of indisposition. . . .

‘The third quarter presents a different aspect, the mortality being more than twice as great. The aggregate of deaths was 104, of which 67 occurred at three posts, viz: at Baton Rouge 35, Fort Scott and neighboring encampments 18, and Fort Gadsden 14, leaving but 37 for all the other stations. . . . At Fort Scott, there

were still in operation the same causes of disease — intemperance, and irregularity of every description. The police was exceedingly defective; and the recruits, brought from the north, resembled the paupers which, in more recent years, have been transported to our shores from Europe. During this quarter there were 12 cases of scurvy; and nearly every fatal case of disease might be traced to the abuse of spirituous liquors. For the last two years,' says Surgeon Lawson, 'our cantonment has never been encircled by a chain of sentinels; nay, the resemblance scarcely of guard duty has been maintained within our command. . . .

'Moral as well as physical causes then, may be considered as having had an agency in producing the prostration of the 7th Infantry. Prostrate indeed it is, for it is crippled beyond recovery, and lies a wreck subject to the influence of every blast.'

In 1825, the Surgeon General gives a table showing the death rate in the 1st Infantry at Baton Rouge for six years, 'doubtless higher than that of any other regiment since the organization of the government.' The regimental strength varied from 123 to 479, the annual deaths from 29 to 85, the *percentage* of deaths was 12.8 in 1819, 22.2 in 1820, 23 in 1821, 25.8 in 1822, 18.5 in 1823, and 17.3 in 1824.

1826 — In the first quarter: At Council Bluffs there were 561 cases of intermittent fever, embracing nearly the entire command.

At Fort Delaware, there are reported 18 cases of enteritic inflammation. Assistant Surgeon Samuel B. Smith makes the following report: '... The severest form of remitting bilious fever (and some of them approached malignant nature) was mildness compared with the enteritic inflammation, caused by drinking the water which was conducted into cisterns by an extensive and badly painted roof. . . . The practice was to bleed freely at every return of the paroxysm of pain. The abstraction of blood, which could in no case be dispensed with, it was necessary not infrequently to repeat several times in the day. Until pain and inflammation had been subdued by blood letting, no medicine was of any avail as a cathartic. Calomel, castor oil, senna, salts, etc.,

were then administered freely, but the calomel did not afford that relief which might have been anticipated. Although used with great freedom, but two cases of ptyalism occurred. Enemata of tartar emetic, and castor oil and salts combined with laudanum, were incessantly employed, as were also hot baths. Wherever blisters could be conveniently placed, they were applied, and opium was freely given occasionally.'

Fourteen more cases occurred in the next quarter and Surgeon Smith submitted another report in which he described the trouble as lead poisoning, and in which occurs the following:

'In some instances, no alvine evacuation could be procured in 14 days: in several, the inference was almost certain that the bowels were contracted in diameter: and in two cases, small portions of intestine came away. I was compelled to put the patients in hot water every six hours, and when in the bath to bleed or cup, or do both. In most cases I must have drawn from 1 to 200 ounces of blood, and for many days no rest could be procured, except when the blood was flowing in the bath. I gave injections of tartar emetic and laudanum, castor oil and laudanum, or an infusion of senna and opium, every three or four hours. Calomel and neutral salts, and calomel as a constitutional remedy, were in hourly requisition.'

1827 — In the fourth quarter it is noted that:

'The detachment of the 3d Infantry, that ascended the Missouri the previous autumn to occupy the cantonment Leavenworth, suffered much from the diseases incident to troops employed in establishing new posts on the frontier. In a command of four companies, there occurred 163 cases of intermittent and remittent fever, of which 11 proved fatal in the stage of convalescence.'

In the last quarter the surgeon at Fortress Monroe reported:

'The use of sheet lead for covering the boilers and furnaces in the kitchens of two companies, the covers being painted over before each weekly inspection, has produced the most disastrous results. It escaped my observation for two weeks, until its effect

suggested an investigation. Cholic, paralysis, and ulcers in their most frightful and obstinate forms, appeared in more than 20 cases in these two companies. The health of all was much impaired, one death resulted, and several who still linger on in a most wretched state, will, I think, recover.'

There is a description and interesting discussion of *dengue*, *breakbone fever*, *scarlatina rheumatica*, which broke out extensively in the South that year.

A few more paragraphs are cited from the Surgeon General's final discussion of the second period of ten years.

'The annual ratio of mortality, on an average of all the posts, is, according to the Adjutant General's returns, 3 per cent or 30 per 1000, and according to the medical reports 2 2/10 per cent. In each calculation, the deaths from epidemic cholera (130) are excluded: and in the latter, those also reported as suicide, asphyxia from cold or submersion, etc.

'The dreadful effects induced by inebriation have been shown in the details of each post. . . . Its agency, directly or indirectly, in the causation of phthisis pulmonalis and epidemic cholera, has been abundantly pointed out and its intimate connection with febrile diseases, diarrhoea and dysentery, and hepatitis, although not definitely determined, is so apparent that it is constantly dwelt upon in the reports of medical officers. . . . Of delirium tremens there are reported, in the northern division, 102 cases and 3 deaths, being 1 in 34; and in the southern, 306 cases and 39 deaths, being 1 in 8. . . . The total of epileptic cases, which generally arise from the excessive use of ardent spirits, is in the northern division, 166 and in the southern, 188, the annual ratio of each being 7 5/10 per 1000. . . . These are not, however, the only deaths arising from drunkenness. Of the 10 deaths reported as *sudden*, the majority is doubtless attributable to this cause. Of the 25 deaths arising from various chronic visceral lesions, the greater proportion has no doubt been induced by the same agent. The 85 deaths under the head of casualties have been reported principally as drowned, frozen, suicide, homicide, wounds, and in-

juries, the result in a great measure of intemperance. The aggregate of deaths in the table furnishing these data is 1,104, more than one half of which are traced to this war against nature. . . .'

Surgeon General Lovell died in 1836, beloved by his Corps and honored by the entire Government.

Born in 1788, he graduated from Harvard at nineteen, studied medicine in Boston, and entered the Army in 1812 as surgeon of the 9th Infantry, but during most of that war he served in and was in charge of the general hospital at Burlington. Always devoted and conscientious, he was deeply hurt when the Secretary of War, with an eye to economy, recommended the abolition of his office in 1830. Lovell's dignified letter of protest showed clearly that the Secretary did not know whereof he spoke and no more was heard of the matter.

His funeral was attended by 'the President's family, the Heads of Departments and Bureaux, and the principal officers of the Government now at Washington.'

He was an able man, — kind and lovable. He was interested in medicine, had a good and well-trained mind and promoted the growth of knowledge and the spread of information. Hence his encouragement of Beaumont (to be discussed) and the efforts to further that officer's work. Hence, also, the periodical reports which he demanded and from which was compiled the interesting publication from which quotations have been made. He was very active in combating the prevalent intemperance of the day, and to him more than to any other one man, probably, was due the abolition of the rum ration. He also instituted the making of weather reports.

The most famous medical officer of this entire period was Dr. William Beaumont, pioneer physiologist, for which reason an account of him will be inserted here. Born at Lebanon, Connecticut, on November 21, 1785, William Beaumont left home on or about his twenty-first birthday, although his father had offered to give him a fine farm if he would remain. With an outfit consisting of a horse and cutter, a barrel of cider and one hundred

dollars in money, he started northward without any particular destination in view, traveled through western Massachusetts and Vermont, settling in the spring of 1807 at the little village of Champlain, New York. Here he taught school and began to read medicine, and in the year 1810 he crossed the lake to St. Albans, Vermont, where he apprenticed himself to Dr. Benjamin Chandler and studied medicine more systematically.

At the termination of his apprenticeship he was licensed to practice by 'the Third Medical Society of the State of Vermont, as by law established,' the license being dated 'the 2d Tuesday of June, A.D. 1812.' As war was beginning, he applied for a place in the medical service of the Army and was appointed a surgeon's mate in December of 1812. He served throughout the war, with an intermission of a few weeks, won commendation, and in 1815, when the Army was reduced, he was continued in service as one of the more competent medical men. He soon after was involved in a quarrel, was near to fighting a duel, and proclaimed his adversary in print as a 'Liar, villain and poltroon.' Soon after he resigned from the Army and started a *store*, containing a general assortment of drugs, medicines, groceries, dyewoods, etc. In March, 1820, he again entered the Army and was ordered to Fort Mackinac. There he remained for about five years. Fort Mackinac was a frontier post, to which Indians and *voyageurs* resorted in numbers. Violence was not rare and the surgical practice was mainly the treatment of wounds and injuries. Among these was the afterward famous case of Alexis St. Martin, the description of whose injury is given in Beaumont's own words in Appendix 3. The clearness and accuracy of the description would do credit to a highly educated surgeon of the present day, although it was written by a man without a degree.

In the fall of 1824, Beaumont sent a report of the case to Surgeon General Lovell, who had it published and encouraged him to continue his observations. As he had no facilities and there was not another doctor within a radius of hundreds of miles, he applied for and received orders for Fort Niagara, a point nearer to

civilization. Thither he took St. Martin, but in August the latter eloped and Beaumont's work had to stop. He published his observations up to that time in 'The Medical Recorder.' In 1826 he was sent to Green Bay where, after advertisement, he again heard of St. Martin and paid \$14, one third of a month's pay, to have him traced. He got him back in 1828 and began anew a series of experiments and observations which continued to 1831, when St. Martin again left him. After an interim of Indian warfare, cholera, and other work, Beaumont again got hold of St. Martin in 1832, when the two signed a covenant, wherein St. Martin agreed to the continuation of observations for one year, in consideration of food, housing, clothing, washing, and other necessary expenses, and other payments aggregating \$150, all to be furnished by Beaumont. Beaumont also obtained a furlough for six months, with permission to go abroad, apparently expecting to take St. Martin with him. He went to Washington and, giving up his plan to go abroad, there resumed his observations, and had St. Martin appointed a sergeant in the Army, thus relieving himself of some expense. He obtained the interest of some of America's foremost men, among them Robley Dunglison, who journeyed from Charlottesville to Washington to see Beaumont and St. Martin and made helpful suggestions, and Benjamin Silliman, who held the chair of chemistry and natural history at Yale.

Beaumont made an 'abstract report' of his observations to the Surgeon General in March, 1833, and in the same year he published his 'Experiments and Observations on the Gastric Juice, and the Physiology of Digestion.'

In his preface he said: 'I had opportunities for the examination of the interior of the stomach, and its secretions, which has never before been so fully offered to any one. This most important organ, its secretions and its operations, have been submitted to my observation in a very extraordinary manner, in a state of perfect health, and for years in succession. I have availed myself of the opportunity afforded by a concurrence of circumstances

which probably can never again occur, with a zeal and perseverance proceeding from motives which my conscience approves; and I now submit the result of my experiments to an enlightened public, who I doubt not will duly appreciate the truths discovered, and the confirmation of opinions which before rested on conjecture.

'I submit a body of facts which cannot be invalidated. My opinions may be doubted, denied, or approved, according as they conflict or agree with the opinions of each individual who may read them; but their worth will be best determined by the foundation on which they rest — the incontrovertible facts.' This book excited great interest in both Europe and America, and brought Beaumont many letters of esteem and appreciation.¹

Surgeon General Lovell had allowed Beaumont much leave of absence for the pursuit of his studies. After Thomas Lawson became Surgeon General, Beaumont applied for another leave. Lawson replied that 'similar applications from officers having much stronger claims to indulgence than yourself have been refused on account of the pressing demands for medical officers, your request cannot be granted.' Beaumont tendered his resignation, which was accepted.

Dr. William Osler, in an introduction to Myers's 'Life' of Beaumont said: 'To the medical bibliographer there are few more treasured Americana than the brown-backed, poorly printed octavo volume of 280 pages with the imprint "Plattsburgh, Printed by F. P. Allen 1833." . . . The pioneer physiologist of the United States and the first to make a contribution of enduring value, his work remains a model of patient, persevering research.' Thus we take leave of the scientist and return to the lesser but, to the Army of the period, more engrossing affairs of the military service.

Surgeon General Lovell was succeeded November 30, 1836, by Thomas Lawson, who did not, however, actually undertake the

¹ Myers, Jesse R.: *Life and Letters of Dr. William Beaumont*. C. V. Mosby Company, St. Louis, 1912.

duties of the office until 1838, being meanwhile engaged in organizing a battalion of New York and Pennsylvania volunteers for the Florida Seminole War. Something of the character of the medical service in that war is shown by General Lawson's tribute to Surgeon Richard Clark:

'The service in Florida to most of the medical officers employed there, has been indeed not only irksome, but exceedingly laborious and hazardous, many of them having from the very dispersed state of the troops, to give their attendance to two, three or more posts or stands; frequently passing from one station to another without an escort and occasionally under the fire of the enemy.

'Among others whose lot it was to perform more than ordinary duty was the accomplished Surgeon Richard Clark, who in the height of his usefulness was lately cut off by disease. Doctor Clark having been called to a distant post where the whole command, officers and men, lay prostrate from disease, he at once gave all the energies of his mind and body to the assistance of his suffering comrades, and while thus engaged in administering by day and by night to the diseases and to the wants of the sick, he was inhaling the noxious vapors of the place, even to his own destruction. After rendering much assistance and indeed all the aid practicable, he himself sank to the ground and in a day or two afterwards yielded up his gallant spirit, a martyr to the calls of humanity and his country's good.'

The Acting Surgeon General's report for 1841 (Maryland 'Medical and Surgical Journal,' 1842, II, 312) shows that the mean strength of the army was 9748 men, and the admissions to sick report 38,559. Of those sick, 320 were discharged from the service, 30 deserted, and 387 died.

In 1840, the Medical Department was given a new uniform, with an aiguillette instead of epaulettes. This was an odious distinction to which medical officers objected. Being called upon to express his opinion, Surgeon General Lawson wrote to the Adjutant General, in part, as follows:

'As it is unusual for a subaltern officer to dictate to his chief, I

have upon reflection come to the conclusion that it is better for me not to suggest anything to the Secretary in relation to a change of uniform.

'I have been twenty-six and more years in the military service of my country, and very generally with troops on the frontiers and in the field.

'I have been on the theatre of immediate action in every war in which the country has been engaged within my period of service, whether with a civilized or savage enemy, except that with Black Hawk, and then I volunteered my services for the field, but could not obtain permission to leave my station.

'I have acted as quartermaster and as adjutant, and have been for months at a time, in command of a company of men in the regular army. I have also commanded a battalion and a regiment of men in the volunteer service, and have led them to the theatre of war; in the first instance under a commission from the executive of the state of Louisiana, and on the last occasion by the almost unanimous consent of the officers and men who served under my orders; and although my services have not been attended with such brilliant results as those of some other persons, my military career has certainly not been discreditable to myself, or altogether unprofitable to the government.

'If under these circumstances the commanding general of the army could feel himself justified in putting me off with an aiguillette, a piece of tinsel on one shoulder, while he decorates every brevet second lieutenant with an epaulette on each shoulder, and the staff lieutenant with an aiguillette besides, I must be satisfied to remain without a military dress.'^{*}

The epaulettes were restored the following year. From this time to the Mexican War there were many disputes as to the rank, rights, and privileges of medical officers. The close of the Florida War was followed by reduction of the Army and the Medical Department in 1842.

That official life remained real and earnest is indicated by the

^{*} Brown, *Medical Department, U.S. Army*, 165.

following extract from a 'joint regulation of the War and Navy Departments' dated November 15, 1842: 'During the months of May, June, July and August, the signal for commencing work will be given at 6½ A.M. — the signal for recess at 12 M. — the signal to recommence at 1 P.M., and the signal to close work for the day at 6½ P.M.' During the rest of the year the hours were from 7 A.M., or from sunrise if that came later than 7 A.M., to 12 M., from 12.45 P.M. to 6½ P.M., or to sunset if that came before 6½ P.M.

By August, 1845, war with Mexico appeared probable and an 'Army of Occupation,' consisting of one regiment of dragoons, five regiments of infantry, and parts of three regiments of artillery, was concentrated at Corpus Christi, Texas. A general hospital and regimental hospitals were established. In March, 1846, the command was transferred to Brazos Santiago, the sick who could not be moved being left in the general hospital. On May 13, 1846, President Polk issued his proclamation announcing that Congress had declared a state of war to exist. This declaration was a statement of fact, as Fort Brown had been attacked on May 6th, a battle fought at Palo Alto on the 8th, and another at Resaca de la Palma on the 9th.

The lack of preparation for this war and the lack of suitable provision for its continuation are shocking to the modern mind. These shortcomings obtained throughout the entire service, but nowhere were they more marked or more disastrous than in the Medical Department. The doctors were brave and devoted and received praise from the commanders, but the medical record was terrible.

On the day of President Polk's announcement of the state of war, Congress passed an act calling for fifty thousand volunteers from the States. They were to be furnished in regiments, each of which was to have one surgeon and one assistant surgeon. No increase was made in the Medical Corps of the Regular Army, although that had been recommended repeatedly by the Surgeon General. In February, 1847, another act provided for ten more

regiments, each to have one surgeon and two assistant surgeons, and the Medical Corps was at the same time increased by two additional surgeons and twelve assistant surgeons, all to be discharged at the end of the war. The act also gave definite military rank to medical officers. An act of 1848 revoked the direction that the additional officers be discharged. This was done because of the needs of new posts established in the territory acquired by the war.

The Medical Corps, then, at the beginning of the war consisted of one Surgeon General, twenty surgeons and fifty assistant surgeons, and was later increased by two surgeons and twelve assistant surgeons. That constituted the medical personnel provided for all posts and stations, for all staff and hospital duties outside of regiments, and for all regiments of the regular army. The regiments numbered fifteen in 1846, and in 1847 and 1848 there were twenty-four, plus the small Corps of Engineers and Corps of Topographical Engineers.

The Army Register for 1847 shows forty-three regular medical officers on duty in Mexico, one in California, one in Texas, one at New Orleans, and one at Baton Rouge, the remainder at various places in the United States. There were forty-eight medical officers of volunteers, whose stations are not given, but it may be inferred that they were all in Mexico or *en route* thereto. The Register for 1848 showed fifty regular officers in Mexico, two in California, two in New Mexico, one at New Orleans, and one at Baton Rouge. There were then fifty medical officers of volunteers.

The nurses, attendants, and cooks were detailed from the line and usually were themselves sick and unable to do 'full duty.' Thus:

'G.O., No. 123, JALAPA, April 30, 1847

'P. 15: Every regiment that leaves wounded or sick men in hospital will take care to leave a number of attendants, according to the requisitions of the principal medical officer of the hospital. Those least able to march will be selected as attendants. This rule is general.

'By command of Major General Scott,' etc.

Usually there was such urgent need for men for battle that few or no able-bodied men could be spared for the hospitals, and at times the surgeons were obliged to organize their entire personnel from the patients, cooks and nurses being such dysenteric and fever cases as could get about and wait on others. The amounts of sickness and of death were four times as great as in the Spanish-American War.

Hospital equipment was practically *nil*. Concerning the first general hospital established for Scott's expedition, that at Vera Cruz, Surgeon John B. Porter wrote:

'To organize the hospital was no small undertaking: There was not a single steward except invalids and incompetent ones: an invalid wardmaster: no well men left for cooks and nurses, when the army marched away. There was not a single kitchen table, bench, bunk, privy, chamber utensil; in a word, there was nothing but the miserable sick, and under these circumstances the machine had to be put in motion. *Hoc labor, hic opus est.*'

Yellow fever appeared at Vera Cruz, in addition to the malaria, dysentery, etc., and there were 412 cases, with 116 deaths. The surgery was bad and results poor. This Surgeon Porter attributed in part to the use of ether for anæsthesia, and he put on record his intention to use it no more.

General Scott estimated that for the march to Mexico he needed 800 to 1000 wagons and from 2000 to 3000 pack-mules, but only 180 wagons with teams were at hand. Nevertheless he started on April 7th in order to escape the yellow fever, the season for which was at hand. He ordered 'one wagon to be assigned to the Medical Director of each division, for extra medicines and hospital stores.' This constituted the divisional transportation for medical purposes. The march order stated that 'not more than three common tents, principally for arms and the sick, can be allowed to the officers and men of each company.' The men had no shelter other than what they could improvise from cane and boughs. The march lasted, punctuated with heavy fighting, until September 14th, when Mexico City was taken. In the interim

General Scott had written: 'We have about a thousand sick at Vera Cruz, 1000 at Jalapa, 200 at Perote, and 1017 here [Puebla]. We have but 5820 effective enlisted men.' In July he wrote: 'The Army is suffering greatly from want of necessary clothing, including blankets and overcoats. We now have 1000 hands making shoes and pantaloons. About 3000 pairs of each are absolutely necessary to hide the nakedness of the troops.'

Assistant Surgeon William Roberts was killed at Molino del Rey while leading a company into battle. Brown quotes Lieutenant Colonel Lugenbeel's description of the event.

'At the battle of Molino del Rey, Doctor Roberts established his attendants in rear of the regiment in a slight hollow, so as to be protected from the fire of the enemy. When the line was formed and advanced upon the enemy I did not notice the doctor. Very soon afterwards I saw Second Lieutenant C. S. Hamilton, fifth infantry, who commanded Company "I" of that regiment stagger, and fall as if severely wounded. Assistant Surgeon Roberts ran up to him from the rear and after examining his wound said something to him and then started for the line of battle. I called to him to go back, but he pointed to Hamilton's company and ran on. The next I saw of him he was lying down on the field of battle with the wound in his forehead which afterwards caused his death. When I saw Hamilton I asked him about Roberts' singular conduct, and he told me that Roberts came and examined his wound, and told him to go to the rear where his stewards and attendants were, and that he (Roberts) would run forward and take command of his company, as it was without an officer.'

The writings of Surgeon Porter ¹ and of W. B. Herrick ² serve to give us a picture of surgery advanced somewhat beyond that of the Revolution and the War of 1812. There were questionings as to the value of the antiphlogistic treatment, questioning of

¹ *American Journal of Medical Sciences*, 1852, 1853, 1858.

² *Illinois and Indiana Medical and Surgical Journal*, IV (1847-48), 225 and 414.

some of Larrey's dicta in regard to immediate amputation on the battle field. Porter discussed, but did not use, debridement of wounds.

That Porter should have projected some of surgery's shortcomings onto the new anæsthesia was a most human sort of thing such as we are all guilty of at times. Like James Mann in the War of 1812, Porter boasted that he had seen no hospital gangrene, tetanus, or secondary hemorrhage during the Mexican War. For a man of his large experience that was very remarkable.

The medical history of the Mexican War will be closed with the accompanying table on page 61. There is reason for thankfulness that the results were not worse.

In 1855, Surgeon General Lawson made three important recommendations regarding the Medical Department:

First. That the number of officers be increased. A part of his argument for this increase was:

'Our army is spread all over the country, from the Atlantic to the Pacific oceans, occupying eighty-nine military posts and arsenals, each station requiring one physician and some of them two. To supply medical officers to the military posts garrisoned by troops of the line, and furnish the necessary complement of physicians to serve with detachments of men constantly operating in the field, would exhaust the whole number of our regular corps, ninety-four in number, were they all efficient and present for duty; leaving us to supply medical aid to troops passing in transports or by land, from one section of the country to another; to the officers and men stationed in our large cities, on staff and other duties; to the many forts on the Atlantic not garrisoned, but held in charge by a few engineer and ordnance men; and to the various recruiting rendezvous, as best we can, under contract by the month, or by the day and the visit.

'Officers of the Medical Department, however get sick as well as other people; they are entitled to occasional relaxation from duty like other officers; and again they have a claim the same as officers of the line and other staff departments of the army, to the

TABLE SHOWING THE AGGREGATE OF THE REGULARS AND VOLUNTEERS EMPLOYED DURING THE WAR, WITH THEIR AVERAGE DURATION OF SERVICE, AND THE CASUALTIES INCIDENT TO EACH DESCRIPTION OF FORCE.

(From the Surgeon General's Report.)

	FORCES EMPLOYED AND MUSTERED INTO SERVICE		DISCHARGES				DEATHS								WOUNDED IN BATTLE			RESIGNATIONS	DESERTIONS	
							Killed in battle	Died of wounds	Total killed and died of wound ³		Ordinary		Accidental							Aggregate number of deaths — officers and men
	Officers	Men	Officers	Men	Officers	Men			Officers	Men										
		Aggregate off- cers and men	Average length of service during the war	By expiration of service	For disability	By order, and civil authority	Aggregate number of discharges									Officers	Men	Aggregate		
Old establishment.....	15736	26	1561	1782	373	3716	41	22	307	63	729	49	2574	139	3554	118	1685	1803	37	2247
Additional force.....	11186	15	12	767	114	893	5	62	571	10	133	36	2055	30	2264	36	236	272	92	602
Aggregate of Regular Army.....	26922	...	1573	2549	487	4609	46	484	27378	73	862	85	4629	169	5818	154	1921	2075	129	2849
Volunteer force.....																				
General staff.....	272	...	...	...	47	47	1	...	...	1	...	16	...	...	17	...	...	...	48	...
Regiments and corps..	73260	10	50573	7200	1969	9169	46	467	100	46	567	(*)	6256	192	7061	129	1189	1318	279	3876
Aggregate regular and volunteer forces.....	100454	...	52146	9749	2503	13855	93	951	27478	120	1429	101	10885	361	12896	283	3110	3393	456	6725

* In the reports of the deaths of volunteers of ordinary disease, officers are not discriminated.

indulgence of a leave of absence from duty to visit their families and friends, and attend to important private business.

'With the aged and permanently disabled officers and the sick, together with those entitled to leaves of absence, our force of ninety-four surgeons and assistant surgeons may be considered as reduced on an average, eight or ten per cent., or to eighty-five effective men for duty. At this time, however, there is but one medical officer on leave of absence; and this one has just now returned from a six years tour of service in the Department of the Pacific.

'Within the last three years there has been paid out, on account of the employment of private physicians, seventy-two thousand five hundred and twenty dollars, averaging twenty-four thousand one hundred and seventy-three dollars per annum; this last sum being about the amount of the annual pay of twenty-four assistant surgeons of the army. Now as we have to expend annually for extra medical attendance twenty-four thousand dollars and more, or the sum of the pay and emoluments of twenty-four medical officers of the army, the question arises whether we shall pay out the money to private physicians unknown to us and employed on the spur of the occasion, instead of regularly instructed and disciplined medical officers, who have been examined by competent persons and found qualified morally and physically, as well as professionally for the practice of physic and surgery in the army.'

Second. The enlistment of competent persons as hospital stewards, to belong to the non-commissioned general staff and to be permanently a part of the Medical Department.

Third. The provision of extra-duty pay for hospital nurses and attendants detailed from the line, to requite them 'for the laborious and loathsome duties they have to perform, and in consideration of their frequent exposure to contagious diseases.'

All three requests were granted by Congress in August, 1856.

In 1859, a board of medical officers was appointed to examine models of ambulances and to revise the supply table. It recommended that trial be made of both two- and four-wheeled ambu-

lances, and also reported a plan for an ambulance system for troops serving in the field. As the warfare then was all with Indians, that was what the board had in mind in recommending the following allowances of ambulances:

(a) For less than five companies: one two-wheeled ambulance per company.

(b) For five companies: one four-wheeled and five two-wheeled ambulances.

(c) For a regiment (ten companies): two four-wheeled and five two-wheeled ambulances.

Two-wheeled transport carts, horse litters, tentage, and other supplies were recommended as medical equipment. These recommendations were a long step in advance, as at that time even civil hospitals were not using ambulances. Although the types of ambulances recommended did not prove on trial to be the best possible and both types were abandoned fairly early in the Civil War, the army entered that war with ambulances, which proved a great help to the Medical Department and to the sick and wounded.

The service of medical officers for the ten years prior to the Civil War was very arduous. The immense new territory acquired from Mexico was filled with Indians hostile to white settlement, troops were scattered over a wide area, and expeditions were frequent. A recently published account,¹ by the late Colonel J. B. D. Irwin, Medical Corps, gives an interesting portrayal of Apache warfare in the Southwest. It deals with the outrages of their famous chieftain Cochise, of the Chiricahua Apaches, of his cruelty, treachery, and bloodthirsty savagery, of Lieutenant Bascom's expedition to recapture stock driven off by Cochise, of its failure, and of Cochise's subsequent attack upon Bascom and his party. A messenger escaped and got word to Fort Buchanan of the party's danger. Irwin volunteered to go to its aid in command of a small party of fifteen men. This he did. He started in a heavy snowstorm, made one hundred miles in two days, cap-

¹ *Infantry Journal*, April, 1928.

turing a mixed herd of cattle and horses together with three Indians, after a fight on the way. Arriving at a cañon they had to traverse, the party found a wagon train plundered and burned. The eight persons with it had been stripped, tied to wagon wheels, and burned with the train. The party reached the besieged company and the Indians made off. Two days were spent in locating and destroying Cochise's village, during which time the remains of six men who had been with Bascom were found. It was then decided, upon Irwin's suggestion, that an equal number of Indian prisoners should be executed in retaliation. This was done.

'Instead of incurring blame for the extreme retribution inflicted, the commanding officer of Fort Buchanan was instructed that:

"The Department Commander directs that you will publicly express to Dr. Irwin, U.S. Army, and to Lieutenant Bascom, 7th U.S. Infantry, his approbation of the excellent conduct of those officers, and the troops under their command in the operations against the Apache Indians during the last month. He emphatically approves of Lieutenant Bascom's decided action in executing the Indian warriors, after the atrocious murders which had been committed by the tribe.'"

Various routes for a transcontinental railway were surveyed in the fifties, mainly 1853 and 1854, and several medical officers participated in the work, usually by contributions of collections of various kinds made by them. Assistant Surgeon George Suckley was the surgeon and naturalist of the most northern expedition, and he wrote of the mammals and the fishes found. His brief medical report contains the following paragraph: 'On reviewing the whole route, the unequaled and unparalleled good health of the command during a march of over eighteen hundred miles appears remarkable; especially when we consider the hardships and exposures necessarily incident to such a trip. Not a case of ague or fever occurred. Such a state of health could only be accounted for by the great salubrity of the countries passed through, and their freedom from malarious or other endemic disease.'

Suckley made a canoe trip of exploration from Fort Owen, near the present Missoula, Montana, to Fort Vancouver. His report of more than six thousand words is too long to include in a brief history of the Medical Department, but a few extracts may be quoted. 'A skin-boat, made of three bullocks' hides, was at length constructed and on the fifteenth [of October] I embarked, with two white men and an Indian, to descend the Bitter Root river.' He reached Fort Vancouver on December 6th. 'The time occupied in making the whole distance was fifty-three days. . . . The running time, exclusive of stops, was two hundred and eighty-five and a half hours, and the distance (approximate) as measured by the course of the rivers, including the greater and lesser bends, was one thousand and forty-nine miles. This will give the average speed of 3.674 miles per hour.'

The following is a short account of the relations of the missionaries and the Indians:

'They came among these Indians about nine years ago, and found them to be a poor, miserable, half-starved race, with an insufficiency of food and nearly naked, living upon fish, camas and other roots, and, at the last extremity, upon the pine-tree moss. They (the Indians) were in utter misery and want — *in want of everything*. Their whole time was occupied in providing for their bellies, which were rarely full. They were of a peaceable disposition, brave, good-tempered, and willing to work. Of spiritual things they were utterly ignorant. Unlike the Indians east of the mountains, they had no idea of a future state or of a Great Spirit. . . .

'Of the soul they had no conception. In the beginning the priests were obliged to depend upon the imperfect translations of half-breed interpreters. The word "soul" was singularly translated to the Indians, by one of these telling them that they had a gut that never rotted, that this was their living principle or soul. . . . They were great believers in charms or medicine. Every man had his peculiar medicine or charm, which was his deity, so to speak; and of it they expected good or ill. With some it would be

the mouse; with others the deer, buffalo, elk, salmon, bear, etc.; and whichever it was, the savage would carry a portion of it constantly by him. The tail of a mouse, or the fur, hoof, claw, feather, fin, or scale of whatever it might be, became the amulet. When a young man grew up, he was not yet considered a man until he had discovered his medicine. His father would send him to the top of a high mountain in the neighborhood of the present mission. Here he was obliged to remain without food until he had dreamed of an animal; the first one so dreamed about becoming his medicine for life. Of course, anxiety, fatigue, cold, and fasting would render his sleep troubled and replete with dreams. In a short time he would have dreamed of what he wanted, and return to his home a man.'

Surgeon General Lawson served in the Army for fifty years; before that for two years in the Navy. He did not die until May, 1861, but he properly belongs to the period before that. He was Surgeon General for twenty-five years. More soldier than physician, he was fiery, strict, jealous of the military rights and privileges of his corps. He labored incessantly to put it on a basis of equality with other branches of the Army. The story of his term as Surgeon General is one of continual struggle for more officers, more pay, suitable uniforms, definite status, and rank equal to that of other officers. He got the uniform, the rank, the salute, two increases in the number of officers, stewards enlisted in the Medical Department, and extra-duty pay for men detailed to duty with the Department. He stands out as a strong and positive figure. He twice had line commands, once a regiment. He had the confidence of General Scott, and he received the first brevet of brigadier general ever given to a medical officer. General Order 23, 1861, which announced his death, described him as 'full of military fire, which not even the frosts of age could quench, and of a zeal for the honor of his profession which made his administration of the Medical Department a model of inflexibility, efficiency and economy.' True and portentous words, inflexibility and economy, so true that a departmental revolution was neces-

sary before the medical work of the Civil War could be carried on at all as needed. Lawson had played a useful and, to the Medical Department, a great part in those fifty years of small things, and he passed, full of years and honors, before the great trial which found most of his surviving contemporaries deficient.

CHAPTER III

1861-1873

THE Civil War, although envisaged for a long time, broke upon a country wholly unprepared for it. The Regular Army numbered but fifteen thousand officers and men who were scattered over the great land in very small commands, poorly trained, poorly supplied, neglected. Regulations, forms, precedence, and emergency action in small bodies made up its life. At its head and at the heads of its departments were old men, most of them veterans of the War of 1812, honored relics of a distant past, in which their minds lingered. The Medical Department was no exception. Seniority promotion and the lack of retirement for age or disability kept the upper ranks full of old men, who all their lives had been engaged in small things. When Surgeon General Lawson was removed from office by death, he was succeeded by Clement L. Finley, who was born in 1797 and had entered the Army in 1818, was handsome, complacent, self-satisfied, and, according to Frederick Law Olmsted,¹ of the Sanitary Commission, vain and incompetent. It is true that he was appointed at a trying time, a time calling for a man of vigor and of vision. He had had an honorable career in the Mexican and Indian wars, but he was not equal to this great task. He was vigorously opposed by the Sanitary Commission, and in less than a year he was relieved of his duties and ordered to Boston. After several vain appeals against the treatment he had received, he applied for retirement. He was placed upon the newly established retired list ² on April 15, 1862, the day before the passage of a bill which reorganized the Medical Corps and gave to the Surgeon General the rank of brigadier general. He died in 1879.

During his surgeon generalcy, not because of it, the general un-

¹ Quoted by Meneely: *The War Department, 1861*. Columbia University Press, 1928.

² Act of August 3, 1861, Section 17.

fitness of the then existing Medical Department had been revealed, an unfitness for which the country at large was to blame, not the medical officers. These had had neither experience nor training for anything larger than post practice and peace-time administration. The Surgeon General had three clerks in his office; there were 114 officers and a small but indefinite number of stewards in the department, no hospitals worthy of the name, no wardmasters, nurses, or cooks except such as were detailed from the line. The one step of medical preparation for war which had been taken, and that was not in contemplation of a civil war, was the adoption of ambulances, and the two ambulances adopted were both failures. Still, they were ambulances, and their use for hauling sick was established. Two types of ambulances had been adopted in 1859. When the War came, some hundreds of them were manufactured and issued to regiments. They were controlled by commanding officers and quartermasters, and Surgeon Tripler reported to General McClellan: 'I found them in general use as pleasure carriages for idlers and accommodation cabs for conveying officers and men from their camps to the city of Washington. A large number of them had already been broken down in this service.' General Rosecrans devised another type, which came into general and satisfactory use during the War, under the name of the Wheeling ambulance.

Early attempts to supply medical personnel were not particularly well considered or liberal. The position of brigade surgeon was created and 107 were appointed. Their status and powers were uncertain and some officers refused to recognize their authority. Congress allowed an increase of ten surgeons and twenty assistant surgeons for the regular Medical Department.¹ The liberal employment of contract surgeons was authorized.

A great defect in the Medical Department provision for personnel was the complete lack of any system of training. Officers learned through their mistakes, just as the writer did in 1898-99.

¹ The same Act authorized the use of female nurses in hospitals when deemed expedient by the Surgeon General or the Senior Surgeon. Their pay was fifty cents a day.

Another great and very serious lack until 1862 was the want of medical inspectors, the real backbone of a large, widespread medical organization.

The army had practically no supplies when war began and it took time to make them, but the War did not wait. Surgeon Charles McDougall, Director of the Army of Tennessee, related ¹ how, at the end of April, 1862, he was ordered to establish a 200-bed hospital at Hamburg, four miles from Pittsburgh Landing, when he had almost no bedding. 'For five days, from morning until night, the unfortunate sick were thrown on the bank of the river, in parties of from 2 to 50, and in most instances without any report other than that they were sick.' Two thousand were sent off to hospitals in Missouri, Indiana, Kentucky, and Ohio, and 2500 to the convalescent hospital at Hamburg. 'Half of the latter were without shelter, for lack of tents.' Instances of lack of supplies could be cited indefinitely.

The Federal Government was not then the strong and dominant power which it is to-day. States' rights were realities: the States raised and equipped their troops and pushed them forward. A number of war governors were outstanding men. The regiments they sent forward had their own surgeons and assistant surgeons, some had regimental hospital equipment, a few had ambulances. There were no general hospitals, and when the assembly of all these untrained men was followed by the usual great outbreaks of disease, hospitals had to be improvised, in hotels, halls, and other unsuitable buildings. They were manned by soldiers detailed from the line. The Surgeon General complained that, on the day before the Bull Run campaign, every cook, nurse, and wardmaster was taken from the Washington hospitals without previous warning. These poor hospitals were so bad as almost to justify the remark of Surgeon Tripler, Chief Surgeon of the Army of the Potomac, that general hospitals were general nuisances, only to be tolerated because armies could not always

¹ *Medical and Surgical History of the War of the Rebellion*, Part First, Medical Volume.

carry their sick. They could not excuse his love for equally bad regimental hospitals. They could not, as his years and experience perhaps did, account for his excessive conservatism.¹

Probably worse than the hospitals, was the total lack of provision for removing the wounded from battle-fields. For days after the early battles the relatives and friends of the wounded searched the fields for them and, if they were fortunate, took them away in carriages.

As early as May, 1861, the organization of an ambulance service was proposed to General Scott, who referred the matter to the Surgeon General, and no more was heard of it. In September, 1861, the Surgeon General of Pennsylvania offered to furnish the Army of the Potomac an ambulance organization of forty-five ambulances and fifteen transport carts, with two officers and sixty-seven men, animals and harness complete. Tripler said he could not accept because medical officers could not command lieutenants, but he approved the proposal and recommended action by the Secretary of War. Nothing was done. In the spring of 1862, another plan was submitted to the Secretary, who referred it to Tripler, who said it was then too late to do anything. To go a bit forward on the trail of similar stupidity, it may be stated that in the very month (August, 1862), in which Letterman's epoch-making plan was put into effect, Surgeon General Hammond proposed a similar one for the entire Army, and General Halleck disapproved it as expensive, cumbersome, and apt to lead to panics.²

The conditions outlined above were known, visible, notorious.

¹ Tripler's failure was by no means due wholly to his conservatism. It is doubtful if either Letterman or Hammond could have been greatly successful at the time and in the circumstances in which he failed. A medical personnel totally inexperienced and partly ignorant and unfit, owing appointments to state politicians and even to colonels, inexperienced staff departments, poor transportation, and the usual deficiencies of improvised armies made his task more difficult than that which confronted Letterman later, when bitter experience had taught many painful lessons, and time had cured some deficiencies.

² *Medical and Surgical History of the War of the Rebellion*, Part III, Surgical Volume, 933.

The Crimean War had shown the terrible results of inattention to hygiene and military medicine, and the clear good sense and reforming zeal of Florence Nightingale had brought about changes in the British organization and practice which resulted in tremendous improvement, while the immobility of the French *Intendance* prevented French medical men from effecting similar improvements. In consequence the world had been treated to another great object lesson, for, whereas in the first year of the war the English losses had been two and one half times as great as the French, after the reforms they were only one thirteenth as great.¹

As early as June, 1861, the Secretary of War, Simon Cameron, reputed more interested in placements and spoils than in Medical Department efficiency, authorized a group of able and public-spirited men to inquire into and to advise in regard to the sanitation of the Army.² This group later formed the Sanitary Commission, which took on wide powers and corresponded in many respects to what a combination of a part of the Council of National Defense and the American Red Cross would have been in the World War. This body soon learned that hospitals were poor and inadequate, organized transport for sick and wounded necessary and lacking, the Medical Department fossilized, and ignorant of the fact. Reform would have to be revolutionary and a new surgeon general was necessary.

The Commission prepared a bill reorganizing the Department and pushed it through Congress with some modifications. It canvassed the field for a suitable man for the surgeon generalcy, and recommended Assistant Surgeon William H. Hammond, then thirty-four years of age, but with a considerable reputation as a writer, and a man of unbounded energy and force.

There were many other candidates for the position, all senior in rank and years to Hammond, and his appointment was effected only after a lapse of time and much insistence on the part of

¹ Sieur: '*Histoire des Tribulations du Corps du Santé militaire*. Bulletin de la Société Française d'Histoire, 1928, XXII, 96-168.

² Stillé, Charles J.: *History of Sanitary Commission*. New York: Hurd and Houghton, 1868.

the Sanitary Commission. There was especially much influence brought to bear in favor of R. C. Wood, a senior among the surgeons and a popular man in social Washington. Hammond was allowed to choose the Assistant Surgeon General, and chose Wood, probably hoping thereby to placate the seniors over whom he had himself passed, but the effort was futile.

Another difficulty was in getting suitable men for the medical inspectorships. There were to be one medical inspector general and eight medical inspectors. Hammond sent in a list of recommendations, Jonathan Letterman being his choice for Medical Inspector General. Only four men on his list were appointed, the other appointments being political.

'At the very outset, therefore, were the plans of the Surgeon General for the improvement of the service crippled by a refusal to provide him with the means which he deemed necessary to carry them into execution.

'This controversy unfortunately was the cause, or at least the beginning, of a want of cordiality between the Secretary of War and the head of the Medical Bureau, the effect of which is clearly traceable in every part of the history of Dr. Hammond's administration.'

Hammond had first entered the Army in 1849 and served several years in the Far West. Always active and studious, he was, in 1857, awarded the American Medical Association Prize for an essay on 'The Nutritive Value and Physiological Effects of Albumen, Starch, and Gum when Singly and Exclusively Used as Foods.'² In 1859, he and Dr. Weir Mitchell published jointly extensive reports of experiments with South American arrow poison.

¹ Stillé, C. J.: *History of the Sanitary Commission*. New York, 1868.

² From this we get Hammond's description of himself: 'I am 28½ years of age, 6 feet 2 inches in height, and measure 38½ inches around the most prominent part of the chest. My weight during the last three years has ranged from 215 to 230 pounds. My habit of body is rather full, temperament sanguineo-nervous. I am of sedentary habits, rarely taking much physical exercise, unless with some specific object in view other than the exercise. I have never indulged freely in alcoholic liquors, and very seldom use them now: tobacco I do not use in any form.' This description was given for the reason that his experiments were made upon his own person.

He resigned from the service in 1860 to accept the chair of anatomy and physiology in the University of Maryland, but when war came he again took the examination and became an assistant surgeon, and was a lieutenant when chosen to be Surgeon General. He was at the time serving in West Virginia under General Rosecrans, as was his friend Letterman.

Hammond proved one of the most striking, energetic, picturesque, and able of Army medical officers. He had large vision, clear understanding, and unbounded energy, and he brought them all to bear upon the task of improving the Medical Department.

He at once issued orders directing the keeping and rendition of proper and fuller records of sick and wounded; calling for reports on fractures, gunshot wounds, amputations, exsections, fevers, diarrhœas and dysentery, scorbutic diseases, respiratory diseases, and 'similar remarks on other preventable diseases.' Important cases were to be reported in full, and all autopsies carefully recorded. He announced the purpose of establishing an *Army Medical Museum*, and directed medical officers diligently to collect and forward specimens. From this order resulted later two great medical achievements, the Museum and the 'Medical and Surgical History of the War of the Rebellion,' both of which acquired international reputation of high order.

While Surgeon General, Hammond, in addition to his other great work, produced a good book on the subject of military hygiene.¹ Because of the non-emergence up to that time of the germ theory of disease, the book has not great general value now, but it had a very useful section on hospital construction.

In his annual report for 1862, to the Secretary of War, General Hammond recommended also: (1) the establishment of a permanent hospital and ambulance corps, composed of men specially enlisted for duty in the Medical Department, and properly officered, who shall be required to perform the duties of nurses in the hospitals, and to attend to the services of the ambulances in the

¹ *A Treatise on Hygiene*. Philadelphia, J. B. Lippincott & Co., 1863.

field; (2) an appropriation for the Army Medical Museum; (3) an Army Medical School in which medical cadets and others seeking admission into the Corps could receive such instruction as would better fit them for commissions; (4) a permanent general hospital in Washington; (5) independent transportation for the Medical Department; (6) construction of hospitals by the Medical Department; (7) the establishment of a central laboratory. All of these recommendations were wise, and, if adopted at the time, would have been very helpful. Most of them were adopted later, after the lapse of from twenty to forty years, and proved of great value to the Corps and to the service in general. It is improbable that any officer or other person having knowledge of the facts would for a moment consider the abandonment of a single one of the improvements recommended by Hammond and later adopted. The Medical Department does not build its own hospitals, but its advice in regard to them is usually accepted, and the coöperation of the General Staff and the other departments with the Medical Department is now so satisfactory that such a necessity no longer exists.

Hammond was not entirely balked, even at that time, in his efforts to secure a Hospital Corps. He had pointed out that such a corps would allow several thousand detached men to return to their regiments, but no enlisted corps was granted. Anticipating refusal, he asked for civilian nurses and cooks to live in the general hospitals. This was approved, and from the personnel so obtained he organized a hospital corps for duty in general hospitals. It was uniformed, and in physical qualifications, discipline, payment, everything except enlistment, was a military body. The pay was \$20.50 per month, with rations and clothing, and the quota was eleven for each hundred patients.¹

There were many ignorant doctors, and medicine and hygiene were in a primitive stage, comparatively, but the Army had also the best available talent, and the medical service was such a

¹ Woodward: *The Hospital Steward's Manual*. Philadelphia, J. B. Lippincott & Co., 1862.

tremendous improvement over that of the Crimean War as to excite admiration from abroad. These improvements did not come through chance. Surgeon General Hammond brought keen intelligence, great common sense, system, and vigor to the Department. Among his wise acts was the choice of Assistant Surgeon Jonathan Letterman to be Medical Director of the Army of the Potomac, and furnishing him with all facilities and broad instructions. The following letter is of interest:

SURGEON GENERAL'S OFFICE

June 19, 1862

SIR:

You are detailed for duty with the Army of the Potomac as Medical Director.

In making this assignment, I have been governed by what I conceive to be the best interests of the service. Your energy, determination, and faithful discharge of duty in all the different situations in which you have been placed during your service of thirteen years, determined me to place you in the most arduous, responsible, and trying position you have yet occupied.

On the eve of your departure I desire to place before you some of the main points which should engage your attention.

1st. You should satisfy yourself that the medical supplies are in proper quantity and of good quality, and that each Regiment has its full allowance, and you will hold the senior medical officer to a strict accountability for any deficiency. The time has passed when the excuse of 'no supplies' will be accepted.

2d. You will lay before the officers of the Quartermaster's Department your necessities in regard to transportation and communicate freely with the General commanding, relative to those things in which he is able to assist you.

3d. You will require all medical officers to be attentive and faithful in the discharge of their duties, and you will report instantly to the General commanding, and to this office, all cases of dereliction.

4th. You will, in conjunction with Assistant Surgeon Dunster, U.S.A., Medical Director of Transportation, arrange for the safe, effectual, comfortable, and speedy transportation of such sick and wounded as in your opinion should be removed from the limits of the Army to which you are attached. You will bear in mind, however, the provision of General Orders No. 65, relative to the transportation of troops, and you will therefore, as far as possible, provide for those cases at such points in your vicinity as may seem best adapted to the purpose.

5th. You will hire such physicians, nurses, etc., as you may require, and as you can obtain on the spot, making known to me immediately your deficiencies in that respect at the earliest possible moment, so that I can supply you.

For the full performance of all these duties, you are authorized to call directly upon the Medical Purveyors in Washington, Baltimore, Philadelphia, and New York, who will be directed to furnish you with everything you may ask for, regardless of supply-tables or forms. You will only be required to notify me by letter what you have ordered, and of whom, and you are directed to correspond frequently with me, and to make known such wants as can only be filled by my requisitions on the several bureaus here or through the orders of the Secretary of War.

And now, trusting to your possession of those qualities, without which I should never have assigned you to the duty, I commit to you the health, the comfort, and the lives of thousands of our fellow-soldiers who are fighting for the maintenance of their liberties.

I am, Sir, very respectfully,

Your obedient servant

(Signed)

W. A. HAMMOND

Surg. Gen'l, U.S.A.

ASST. SURG., J. LETTERMAN,
*Medical Director,
Army of the Potomac.*

Letterman came up to Hammond's high estimate, and so improved the medical service of the Army of the Potomac that his organization, with a few changes which were not improvements, was later enacted into law, and it has formed the basis of our later field organization of the Medical Department and those of other countries; although modern medical departments have their own enlisted men, as recommended by Hammond, and are not forced to use officers and men detailed from other organizations, as was Letterman.

Letterman's first great work was the introduction of system, order, and efficiency into the evacuation of the wounded.

The year 1862 saw the beginning of real warfare. Grant in the West was striking hard, and McClellan advanced toward Richmond. He was in the swamps of Virginia and his army had an enormous amount of sickness. Tripler, his chief surgeon, could not handle the situation. A succession of hard battles added thousands of wounded, all poorly provided for and suffering greatly. On July 1st, Letterman estimated the number of sick at twenty per cent of the entire army. The Sanitary Commission and the State of Pennsylvania sent hospital ships. These removed thousands, but when the army retired to the James other thousands of sick and wounded dragged along with it and still other thousands were left behind to be captured by an enemy who had no better provision for his own sick.

Conditions in the West were little better. Snow and sleet covered the ground about Fort Donelson and most of the wounded had no shelter. There was little improvement at Shiloh, although Surgeon J. B. D. Irwin did there improvise a field hospital of tents not belonging to him.

Even after second Bull Run (July 29 and 30, 1862) the wounded of Pope's army lay for a week and many died from lack of attention.

Relieving Tripler as Medical Director of the Army of the Potomac on July 1, 1862, Letterman quickly formulated a complete and effective ambulance plan for that army, and on August

2d it was put into effect by a general order. Time was required to get the necessary ambulances, the army was moving, and it was not until September that the plan had its first real trial. Two hundred ambulances joined the army at Frederick just before the battle of Antietam (September 17, 1862), and in that battle Letterman's system proved its efficiency. All wounded men were collected within twenty-four hours, and placed under shelter. This shelter was usually poor, as there were no field hospitals. Supplies were also scarce, but the Sanitary Commission was able to furnish enough to carry on for a few days, until Government supplies arrived.

So successful was Letterman's system of evacuation that it was afterward extended to all of the armies of the United States and it has formed the basic model for all subsequent plans. The ambulance personnel was drawn from the line, was organized on the basis of the army corps, and commanded by line officers. A captain was in command of the ambulances of the corps, a first lieutenant of those of a division, a second lieutenant of those of a brigade, and a sergeant of those of a regiment. The disposition of ambulances and general control of evacuation of wounded lay with the Medical Director of the Corps. This placing of the equivalent of an infantry company or more, officers and men, under the direction of a medical officer was something new in our service.¹

The general hospitals early established in churches and halls had proved so inadequate that the construction of others had been undertaken. In 1861, Assistant Surgeon Hammond, Inspector of Hospitals at Wheeling, had recommended to Letter-

¹ Although no record has been found to prove it, the proposals of Hammond and of Letterman for an ambulance corps bear so close a resemblance to Larrey's *légion des ambulances volantes*, which was attached to Napoleon's *Garde Impériale*, as to leave little doubt that they were founded thereon. Both were well-informed men and Larrey's *Mémoires*, with detailed description of his legion, its organization, vehicles, harness, and methods of work, was a widely known and highly esteemed work. It is interesting also to note that the two types of ambulances adopted in 1859 corresponded to the two types used by Larrey.

man, then Medical Director of the Army of Occupation of Western Virginia, the use of a type of pavilion hospital which was the result of Crimean experience; and at Parkersburg, Grafton, and Newkirk, West Virginia, such hospitals were constructed in the spring of 1862. The type was so satisfactory that its use was greatly extended. It later formed the basis of the design of Letterman General Hospital at the time of the Spanish War, and that, in turn, served as the basis of plans for types A and B hospitals in the American Expeditionary Force in 1917-18.

General Upton ¹ related how, under the unfortunate system of reliance upon State militia during much of the war, the Army was depleted by absenteeism, to which general hospitals contributed. War governors were human, ambitious, politicians; sick soldiers had votes and they belonged to the States. The governors sent agents to battle-fields and hospitals to take them home, whence few returned to the colors. Surgeon John Brinton, writing of the western armies in the first half of 1862,² said:

'This pernicious custom of leaving the command on the plea of sickness was becoming too prevalent, and had been much encouraged by the presence of boats fitted out by governors of States and by volunteer commissions. When it was once understood by any command that a boat from their own State lay at the landing for the reception of the State's sick, it was found impossible to prevent the flocking on board of many whose only complaint was nostalgia. The really sick were left behind, and the convalescent, and often the malingerer, was sent away. When, however, the large hospitals had been once established, these difficulties were remedied. The sick from the regiments were at once received into general hospital, and, when perfectly convalescent, they were returned to duty.'

Often such boats absolutely refused to take any men not from

¹ Bvt. Brig. General Emory Upton: *The Military Policy of the United States*. Washington, Government Printing Office, 4th impression, 1917.

² *Medical and Surgical History of the War of the Rebellion*, Part First, Medical Volume.

their States. Once home, the soldiers could obtain discharges upon the certificates of 'physicians in good standing.' Surgeon General Hammond charged that the first Medical Inspector General (Perley) signed discharges in blank and sold them.¹

Upton's statement (page 412), that 'The establishment of General Hospitals . . . was a well-known concession to political influence,' is grossly wrong, unless he regards the demands of common-sense and of the Sanitary Commission as political influence. If they were such, it is to be hoped that the Army may always possess such a saving remnant of influence. There were both venality and harmful interference by politicians in the conduct of the war. They were all but ruinous to the Army and should not again be allowed, but Upton was unhappy in his citation of the establishment of general hospitals as an example of either. The mistake lay, as Upton also showed, in allowing State agents to take the soldiers from the hospitals to their States and homes and in allowing discharges on all sorts of excuses.

From the battle-fields or their extemporized shelter for wounded the Government conveyed the wounded to the general hospitals in such trains as it could obtain and at such time as it could obtain them. The trains were often freight cars, the attendance provided was improvised, and the sufferings of the wounded cruel. In the summer of 1862, Dr. Elisha Harris, of the Sanitary Commission, planned and had furnished a number of hospital railway cars, with beds, supplies, and personnel. As the war went on, still better regular hospital trains were fitted out by the Government. In the fall of 1862, regular daily hospital train service was in effect between Washington and New York, and within two weeks after the battle of Gettysburg, after the railroads had been repaired and trains could run, three fourths of the wounded had been removed to general hospitals. Similar trains were used in the West, and later from Atlanta to Louisville. Altogether hospital trains carried 225,000 patients during the war.

¹ *Statement of Causes which led to Dismissal of Surgeon General William A. Hammond*, 19 and 20.

Hospital ships were early fitted out to carry patients by water, the first boat so used being the City of Memphis, taken for the purpose by General Grant at Fort Henry in February, 1862. It carried seven thousand patients to Ohio River hospitals. On April 19, 1862, Surgeon General H. H. Smith, of Pennsylvania, whose ambulances had been refused, appeared in person at Yorktown with a well-equipped hospital ship. The Government provision at the time was an arrangement to remove sick in returning freight boats. Dr. Smith soon had a second boat ready and the Sanitary Commission provided a third by the first of May. Later, the Government provided many real hospital ships.

The larger movements outside of the combat armies were the concern of the Surgeon General. Let us return to Director Letterman. The success of his system of field evacuation established, he next turned his attention to supplies and field hospitals, both of which were in sad need of it. A complete and effective supply plan for the Army of the Potomac was put in operation on October 9, 1862. He then devised a workable and satisfactory field hospital plan and was able to put it into effect by a circular, dated October 30, 1862, to his own subordinates. This plan received its first trial at Fredericksburg on December 13, 1862. All the wounded were not only promptly collected and carried off the field, but they were also placed in tent hospitals and there well cared for until their early evacuation to general hospitals in Washington and farther north. This development completed the series of necessary steps to insure the prompt, efficient, and humane care of the wounded from battle-field to well-equipped general hospitals wherein they could receive proper treatment until their recovery or discharge. For these steps Surgeon General Hammond and Surgeon Letterman deserve gratitude. Their system, with some additions and alterations, was in use throughout the World War.

Unhappily, not much progress had been made in the prevention of disease, which is fully explained by the fact that bacteriology and its twin, modern hygiene, were yet unborn.

At the end of 1862, there were more than 90,000 sick and

wounded. For these there were 151 general hospitals with 58,715 beds. Many were in field hospitals, many sick at home. Some of the general hospitals had as many as 3000 beds. There were 13,000 beds in Washington alone.

In 1863, the amount of sickness and the numbers of wounded increased. In November of that year, 13.5 per cent of the Army was in hospital, 11 per cent sick, the remainder wounded. The general hospitals had been increased and improved and had 84,472 beds.

In 1864, the system was working well and caring for the great numbers of sick and wounded in a manner creditable for that day. In November, 16 per cent of the army was in hospital, 9.3 per cent sick, 6.46 per cent wounded. There were then 190 general hospitals with 120,521 beds. About one third of the sick and wounded were in field hospitals.

Meanwhile, beginning with Hammond's surgeon generalcy, there had been a great improvement in medical statistics and reports, and from the records made the great 'Medical and Surgical History of the War of the Rebellion' was later compiled.

Meanwhile, also, Surgeon General Hammond, who was probably too much like Secretary Stanton to get on well with him, was thrown out of office. Just what caused all the trouble between these two forceful and great men does not appear to be of record. Its origin has been referred to. They had trouble, and it now looks as though a definite plan were laid to 'get Hammond's scalp' or his 'goat,' or whatever the slang of that day used to indicate the object aimed at, his ejection from power and his humiliation.

In July, 1863, Secretary Stanton appointed a special commission, headed by Andrew J. Reeder, to examine Hammond's papers and records. Hammond afterward charged that Reeder was a personal enemy of long standing.

In August, Hammond was ordered away from Washington, on the pretext that sanitary matters in the South demanded his personal attention. He was directed to proceed to Hilton Head,

Charleston Harbor, and other points, to make his headquarters in New Orleans and to report to the Secretary of War every ten days. Two or three days after his departure, his office assistant, Surgeon J. S. Smith, was ordered from Washington to St. Louis. Arriving there, he found orders to proceed to New Mexico. Medical Inspector General J. K. Barnes was directed to perform the duties of Surgeon General. Somewhat later, Hammond was placed on waiting orders and directed to remain at Nashville.

He protested against being deprived of his office and demanded trial. Unknown to him the charges were about ready. They were drawn up and signed by the Judge Advocate General. Hammond was tried and convicted.

Pilcher states,¹ on the authority of a member of the court, that the court acquitted him, but it was reconvened for reconsideration of the verdict and found him guilty. He was dismissed on August 30, 1864. He was left without funds, and on money contributed by friends, he went to New York, where he afterward became a leading practitioner, writer, and teacher of mental and nervous diseases. In 1878, he applied to Congress for vindication. The Senate and House Committees of Military Affairs were of the opinion 'that Dr. Hammond was made a victim to a series of antagonisms, . . . through the Medical Bureau of the Army; the jealousy of his corps officers, overslaughed in rank; the rapacity of greedy contractors; bickerings among surgeons from civil life; the distresses of sick and wounded; and personal controversies of every nature.' As to the trial, they said 'that the gravamen of all the charges, save one, was either disproved by the defense, abandoned by the prosecution or eliminated by the findings of the court. The single charge was in itself trifling, if not frivolous.' They also said: 'It is reasonable, therefore, to infer that men of the positive natures possessed alike by Secretary Stanton and Dr. Hammond, would decline to yield or stand by for each other to pass, when they crossed and crowded upon what each con-

¹ *The Surgeon Generals of the Army*. Carlisle, Pennsylvania. Association of Military Surgeons, 1905.

ceived to be the path of mutual duty. When they collided it was the gage of battle leveled by both — a war by the Titans, a struggle for the mastery. One or the other must have fallen in a conflict of such natures: for there was no middle ground for accommodation between them. Secretary Stanton, in the extraordinary pressure of the times, no doubt became impressed that the displacement of Surgeon General Hammond would conduce to the benefit of the public service and, possessing the greater power, accomplished, by means of indirection, the desired result.' The findings and sentence of the court were annulled and Hammond was made a brigadier general on the retired list. Having then abundant means, he waived the pay. He returned to Washington, and led an active, showy, and conspicuous life until his sudden death in 1900.

Before leaving him it is amusing to consider his famous 'calomel order.'¹ It stated that the reports of the Medical Inspectors and the Sanitary Reports showed that the use of calomel had been pushed to excess by military surgeons, causing innumerable cases of profuse salivation and the not infrequent occurrence of mercurial gangrene; it was therefore ordered stricken from the supply table, as was tartar emetic. In that day, when bacteriology and the causes of infections were alike unknown, calomel was probably regarded as more nearly a panacea than any other drug.² It was used in the greatest variety of diseases, and such use was almost a sign of medical orthodoxy. The Thomsonian eclectics and homœopaths reviled and decried it, but the old regular regarded it with an emotionally tinged sentiment of almost religious nature. The row created was immense, but the order stood. The drug could still be obtained, however, on special requisition, so it is probable that salivation went on, even if at a reduced rate.

The Sanitary Commission praised Hammond's work very highly and gave him the credit for a complete and most wholesome reform of the entire work of the Medical Department. He was certainly a man of parts, picturesque, enormous, tactless,

¹ Circular No. 6, S.G.O., 1863.

² See Appendix 2.

contentious, Paracelsian, self-advertising, something of a pretender, but great.

In January, 1864, about the time of Hammond's trial, Letterman resigned. The only reason he gave the public¹ was: 'It was evident that no military movements could be made by the Army: the season of the year would effectually prevent them. The Medical Department had been completely organized in all its branches, the method of supplying had been changed, and so arranged that medical officers could be at all times well provided; field hospitals had been instituted to the great advantage of the wounded; an ambulance system had been established, which operated well. Little more remained to be done beyond the ordinary routine duties.' These reasons for laying down a great military task in the midst of a tremendous war are not convincing. Speculation suggests that the fall of Hammond and the ascendancy of his enemies made the outlook bad for Hammond's friends and favorites. It was in the power of those enemies to give Letterman much trouble, by inspections, complaints, and harassments. It is interesting that Harvey Brown, in his 'History of the Medical Department,' mentions Letterman but twice, one time as a member of an examining board, while his discussion of Hammond's trial was neither full nor frank. The old crowd was back, the innovators due for punishment.

Letterman became superintendent of a commercial company in Southern California, but the venture was not as prosperous as he had expected, and he later went to San Francisco and took up medical practice. There he died on March 15, 1872, at the early age of forty-eight years, highly esteemed and honored, deserving the gratitude of his country.

Thus passed from the Department the two greatest medical officers of the Civil War. Both were appreciated at the time by the Sanitary Commission, both are now great men to the Medical Department.

¹ Jonathan Letterman, M.D.: *Medical Recollections of the Army of the Potomac*. D. Appleton & Co., New York, 1866.

After Hammond's dismissal, Acting Surgeon General Joseph K. Barnes was made Surgeon General. He continued in the position until his retirement for age in 1882, being a year beyond the age limit at the time of the passage of the act establishing that limit. He did much for the Medical Corps and the service. He took no backward step, carried forward the improvements initiated by Hammond, and, having the confidence of Secretary Stanton, was able to accomplish much in addition. In his annual report for 1866 he acknowledged fulsomely the Secretary's favor and assistance.

He secured the vesting of exclusive control of general hospitals, hospital ships, and hospital camps in the Medical Department, the ample recognition of the Medical Corps in the bestowal of brevet commissions at the close of the war, the development of the Army Medical Museum and the Library of the Surgeon General's Office, and the compilation of the great 'Medical and Surgical History of the War of the Rebellion.'

Barnes saw that, at the end of the war, the Medical Department retained the same proportion of the several grades as during the conflict, and he strenuously, and often successfully, opposed movements which would cripple its work. The high standards of officers were maintained.

Under him Lieutenant Colonel, then Lieutenant, Billings prepared the first printed catalogue of the Surgeon General's Library, a small duodecimo pamphlet of twenty-four pages. Surgeon General Barnes allowed \$80,000 from the general hospital fund remaining on hand after the war for the improvement of the Library, and he thereafter got Congress into the good habit of making an annual appropriation for it.

Surgeon General Barnes's report for 1866 shows that during the Civil War 29 medical officers were killed in battle, 10 died of battle wounds, 55 others received battle wounds, 12 were killed accidentally, 4 died in Confederate prisons, and 231 died of disease.

The 'Medical and Surgical History' states that 'during the

years of the war the organization of the Regular Staff had been increased so as to number one Surgeon General, one Assistant Surgeon General, one Medical Inspector General, sixteen medical inspectors and one hundred and seventy surgeons and assistant surgeons. There had been appointed 547 surgeons and assistant surgeons of volunteers; there were mustered into service between April, 1861, and the close of the war, 2108 regimental surgeons, 3882 regimental assistant surgeons. During the same period there were employed 85 Acting Staff Surgeons and 5532 Acting Assistant Surgeons.' The total is 12,343, or roughly 6 per 1000 men.

The Medical Department of to-day owes more to the Civil War than most of its members realize. In addition to the systems of evacuation and hospitalization then developed, the convalescent camp was in use. Such camps were not limited to convalescents but the medical part of them was the larger part. Their importance may be judged from the fact that between August 17, 1862, and February 26, 1865, 224,381 men passed through the great convalescent camp at Alexandria, Virginia.¹

The year 1864 ended with both Hammond and Letterman out of the army, but the machine they had built was working efficiently, and it was not changed. The army now had 204 general hospitals with 136,894 beds. There were 21,426 beds in Washington alone. The evacuation system was very good and supplies were plentiful. Sherman's army was met at Savannah by four first-class steamers carrying complete supplies for five thousand beds. Fortunately they were not needed since Sherman's rapidly moving army was the healthiest of the war.² The death rate from sickness in 1865 reached the high point of 66 per 1000, but this included many old, chronic cases, and others retained in hospital after muster out of their regiments. As mustering out proceeded, sickness decreased so rapidly that by the end of 1865 there were but 31 general hospitals, and a year later none.³

¹ Charles J. Stillé: *History of United States Sanitary Commission*. New York, 1868, p. 301.

² *Surgeon General's Report*, 1865.

³ *Surgeon General's Report*, 1866.

An act of July, 1866, fixed the strength of the Medical Department at one Surgeon General, one assistant surgeon general with the rank of colonel, one chief and four assistant medical purveyors with the rank of lieutenant colonel, who when not acting as purveyors were assignable as surgeons, sixty surgeons with the rank of major and one hundred and fifty assistant surgeons with the rank of lieutenants of cavalry for the first three years of service, and thereafter that of captains.

After the war the army was scattered in small stations throughout the South and on the Western plains. So numerous were these stations that the employment of 264 acting assistant (contract) surgeons was necessary in 1866 and of 282 in 1868. There were 32,896 officers and men in 239 posts in 1869 and 32,429 in 217 posts in 1870. As a law of March, 1869, had directed that no new appointments be made in the Medical Department, there were in 1870 two vacancies in the grade of surgeon and 42 in that of assistant surgeon.

There were numerous minor hostilities by and expeditions against the Indians, helping to account for 263, or 9 per 1000 of strength, of wounds, accidents, and injuries, with a death rate of 4 per 1000 from the same causes in the year ending June 30, 1870. The deaths from these causes were 5 per 1000 in 1871, 4 per 1000 in 1872, and 7 per 1000 in the year ending June 30, 1873, the year of the publication of Brown's 'History of the Medical Department.' Brown wrote of an 'old army,' an army and a medical service now hard to visualize or even to imagine, of a day when modern medicine and modern hygiene were not yet facts and when science was just entering upon the labor which was to result in the birth of bacteriology. So here, properly, endeth the first lesson, a lesson of hardships borne bravely as a matter of course, of a land mastered for civilization, of the courage and struggles of pioneers in the land and in medicine.

At the close of this first century of our history, the steam engine and the electric telegraph were parts of national life, and slavery was dead. Life was still simple and narrow, duty plain and

alcohol a stand-by. Without smokeless powder or gas engines, soldiers were as much soldiers; without large technical training, men were as real men as now or at any other time. Birth, love, children, work, insatiable curiosity, and high courage made life interesting as they do now, and if the reaper cut more 'flowers that grow between' than he does now, there were more springing up to replace them.

The period here dealt with saw great advances in medicine, particularly in physiology, gross and cellular pathology, in description and identification of diseases and their symptoms and physical signs. The operative technic of surgery had been improved. In a way, it was also coming to be recognized that disease prevention and cleanliness were related; but unfortunately, the actual causes of infections, the means of their transmission, and the reasons for recovery and immunity from them were almost as unknown as during the preceding centuries. Deprivation diseases, except scurvy, were unrecognized, and scurvy was not effectively prevented.

In physiology, the work of Beaumont had lifted the subject of digestion from the realm of speculation to that of observation and experiment, which event was soon followed by Claude Bernard's elucidation of the glycogenic function of the liver, the digestive functions of the pancreatic juice, and the fact that gastric digestion, apparently the whole of it after Beaumont's observations, was merely a preparatory act. Bernard also demonstrated the vasomotor mechanism, not anticipating H. E. Campbell's and Brown-Séquard's American work on parts of the same subject, and did much on the physiology and pathology of the nervous system. In this period Liebig had popularized chemistry and had written of the application of organic chemistry to physiology and pathology. Duchenne, Charcot, and Brown-Séquard had founded modern neurology.

Pathology advanced from the organ pathology of Hunter to the tissue pathology of Bichat and thence to the cellular pathology of Virchow, whose 'Cellular-Pathologie' had appeared in 1858.

He had written upon many subjects, and at the end of the period was probably the most outstanding medical figure in the world. Samuel D. Gross's 'Elements of Pathological Anatomy,' published in 1839, had been the first exhaustive treatise on pathological anatomy in America, but Baillie, Hunter, Hodgkin, Bright, and Addison had all illuminated the subject in English. In medicine, 'fever' was separated into many groups and entities. Measles, scarlatina, and r  theln, erysipelas, smallpox, and chickenpox were clearly distinguished. Gerhart, an American, in 1837 differentiated typhus and typhoid, formerly always confused. The venereal diseases, believed by John Hunter to be one, in part probably because, by inoculating himself with gonorrh  a, he contracted syphilis, were distinguished as three diseases. Scrofula was supposed to be a cross between or mixture of tuberculosis and syphilis, but the tubercular element became more definitely recognized. Bilious remittent fever gradually separated into yellow fever, dengue, typhoid, and malaria; the 'dry gripes,' concerning which Franklin published a pamphlet, was recognized as lead poisoning. Pneumonia, pleurisy, and pulmonary tuberculosis were distinguished. Dropsy, from the status of a disease, fell to a symptom of kidney disease, cirrhosis of the liver, heart failure, venous obstruction, or an  mia, all separable and recognizable. Richard Bright described and illustrated beautifully various kidney diseases. Addison did the same for pernicious an  mia and suprarenal disease. Stokes and Adams described what we now know as heart-block, and the valvular diseases of the heart and their frequent dependence on rheumatism became well known. Basedow and Graves described exophthalmic goiter, and Hodgkin the disease still known by his name. Bretonneau separated diphtheria from other sore throats, and Paget described the disease of the bones, osteitis deformans, and the cancer of the nipple, which are both known by his name.

Skin diseases, said to have been divided by John Hunter into those that mercury would cure, those that sulphur would cure,

and those that the Devil himself could not cure, had been better classified by Hebra.

A dental school was founded in Baltimore before the Mexican War, and training schools for nurses were established in Boston, New York, and Philadelphia in 1873.

General anæsthesia, by chloroform and ether, came about the middle of the period (1847), and was the greatest medical or surgical advance made in it, but surgery made other great advances. All of the amputations were done; simple fractures and dislocations came to be pretty well treated. Ephraim McDowell repeatedly performed successful ovariectomy for tumors, and herniotomy on non-strangulated hernia. Marion Sims founded modern gynæcology, and in this period Samuel D. Gross raised American surgery to new levels. The Civil War furnished great surgical experience.

The physicians' armamentarium was wondrously enlarged during this time. Laennec developed and taught auscultation and invented the stethoscope. Piorry taught the use of mediate percussion in diagnosis. The clinical thermometer, invented long before, came into general use after the Civil War, as did the hypodermic syringe. The retinoscope, ophthalmoscope, laryngoscope, and rhinoscope opened new ways for diagnosis. Richard Bright taught urinalysis. Cylinders and prisms came into use for spectacles, superimposed on the earlier spheres. The microscope was wonderfully improved and was a necessity for study of the cellular pathology which Virchow taught. Achromatic objectives, the Abbé substage condenser and oil immersion lenses brought it within sight of its present-day excellence.

Altogether, the factual basis of medicine had been enormously broadened, a scientific spirit had come to permeate the profession, scholasticism had weakened and had been largely replaced by skepticism and curiosity. At the end of the period, Pasteur and Lister were actually writing of the great discoveries which were to revolutionize medical thought, Pasteur of the 'infinement petit' and Lister of antiseptics. They were not known in America, but they lived and wrought.

Progress was accelerating. Charles Darwin had loosened the rivets of the shackles on thought. It now seems that almost any sort of prophet should have foretold that the next half-century was to see such growth and popularity of science and of medicine as had never been seen in the world.

If much that was thought and done then is now considered folly, we may know that much which we think and do will be folly in its turn. All that goes with the seed was the same then as now, and if we can use it as well in the light of our day as our fathers used it in theirs, we shall not have done badly.

PART TWO

FROM 1873 TO THE SPANISH-AMERICAN WAR

There was a noise: and behold a shaking,
and the bones came together, bone to his bone.

Ezekiel, xxxvii, 7

PART TWO

FROM 1873 TO THE SPANISH-AMERICAN WAR

CHAPTER IV

THE ARMY IN THE SEVENTIES AND THE EIGHTIES

ONE cannot know the Medical Department without knowing the Army, of which it is a part. To evoke from the past an army that exists no more, a life that has disappeared, is a task difficult or impossible for an unimaginative man writing history by order. So no apology is made for seeking help from men who were a part of that vanished army and that past life.

Let us first consider an old private soldier's recollections. Mr. H. Harbers was a private in the seventies. He was furnished a few written suggestions, which constitute the headings of his narrative:

'First Enlistment. For five years, on April 16, 1872, I was sent to Newport Barracks, Kentucky. The pay at that time was Sixteen Dollars per month. Congress changed it to Thirteen Dollars and hosts of men deserted. In September, 1872, I was assigned to Fort Hayes, Kansas.

'While at Newport Barracks we were marched after Reveille each morning and received a solution of quinine (about three grains) and one ounce of whiskey.

'Travel to Permanent Station. Arrived at Hayes City the 12th of September, and marched 125 recruits to Fort Hayes. At that Post we were assigned to companies. I drew Company D, and left on foot to Camp Supply, Indian Territory, by way of Fort Dodge, Kansas.

'As there were no bridges over the Arkansas River, we all had to cross overhand by a rope which had been stretched across the river by being floated over previously by an empty water wagon. We made camp after all had been landed, all sleeping in the open

with the heavens as a tent. After breakfast the next morning, the march was resumed. We made about fifteen miles, or a good water hole, that was the main object. There was only one Springfield rifle along, and the officer carried that. Game was shot on the road, as we only had hardtack and bacon as a travel ration at that time. Vegetables were not part of the ration on the march or in garrison. Lambs quarter was picked as greens, along with wild garlic, to keep scurvy away. Those were hard times. At night one man carried the only gun, for protection of the camp.

'Barracks. Barracks were of stockade construction, dirt floors, heated by wood stoves. In winter, snow would pile up in quarters, which were made U-shape. Water barrel, out-houses and laundry quarters in rear. No bath facilities, if you wanted to bathe, your bunky would pour water from the barrel, and in summer you could go to the creek. (Mind this was accomplished out of doors, not inclosed.)

'Equipment — Uniform, Bedding, etc., Issued. Uniform was prison made, I think, ill fitting, but fair quality, issued by the first Sergeant, as required. Bunks were wooden, double-deck, and straw ticks. Straw was issued monthly.

'Duties. The duties were the ordinary garrison fatigue and guard duties and detailed outlay from the different companies to run the material from Camp Supply, Indian Territory to Fort Dodge, Kansas, as the civilians would not take the contract to disperse the material, on account of Indian hostilities. The Indians would arouse the garrison by setting fire to the grass, and it became necessary for the troops to turn out and proceed to the corrals to obtain gunny sacks with which to extinguish the fires. Half of the garrison would have to do guard duty during that time.

'Housing. The garrison built all houses of stockade construction, and it was a continuous duty every day. There was no lay-off. After coming from guard, the First Sergeant would take your gun and belt and turn you over to the non-commissioned

officer who brought you from the guard-house and he turned the squad over to the Sergeant Major for disposition. Mechanics were classed as carpenters and the rest were laborers. The compensation for mechanics was 35 cents a day and for laborers 25 cents a day. Each company had a detail for one month and part of the laborers and mechanics were sent in the woods to obtain the necessary material for building the stockade quarters.

'Water Supply. The water was obtained from Bear Creek and Wolf Creek in the vicinity of the Post and carted to the different water barrels stationed behind the officers quarters, laundry quarters and barracks. There were no facilities for bathing except from these water barrels, as previously stated.

'Food — Character and Preparation. The food at that time consisted of a meagre ration, which had no vegetables as a component part. The value of the ration was about 13 cents a day. The preparation of the food was as good as could be expected with the material at hand. Potatoes were carted over land, if the company funds would warrant the purchase, and then they were carried from Fort Dodge to Supply by a bull train with the necessary guard to prevent the stampede by the Indians.

'Amusements. The amusements consisted of baseball, running, boxing, jumping and card-playing. Dances were given bi-monthly by the companies and the strongest drink that we could get would be lemonade, and that was made by the use of the extract.

'Hunting. There was an abundance of big game, and on Sunday, the Company Commander would excuse the best shot to go hunting for the companies and run the game as near the Post as possible before being shot, so as not to have such a far haul. There were deer, buffalo, wild fowl of all kinds, including turkeys. The turkeys were only shot during the winter months, and a detachment of ten men, with a non-commissioned officer in charge and a wagon, would proceed down the Cimmaron River and kill whatever they could in the ten days and bring it back to the Garrison for the use of the troops.

'Marches. After the barracks had been built, the place became

infested with rustlers and we were detailed (that is, my company) to bring them in if we could possibly do so. We went after the rustlers and came in contact with them at Mount Jesus. One night I was standing with the Captain at the camp fire, when I told him that I thought that I had placed a line on a small bush but when I looked again it had moved. He said, "Are you sure?" I said, "Yes, I am pretty sure." Well, he gathered twenty men of the Company in a little field piece and circumvented, so as to get behind the place that I pointed out. About nine o'clock the next morning they brought in 150 of the desperadoes, so we were placed in charge of them until they were to be sent to Fort Leavenworth for trial.

'Indian Campaigns — Experiences. The contact with the Indians was frequent, and we would lie down behind the windows with the cartridges strewn over the floor. The Indians would see that they could not make any headway with us, so they would go down to the gardens and ruin them. At night, the sentries had importuned the Commanding Officer to allow the three men of each post to be together, so as to have protection in case of a surprise attack as sentries had been shot at post and it would not be found out until the hour call would be made. One night on No. 2 Post (I was on that Post) and Humpy Brown was on No. 3 Post (the hay stack). At 8.20 I went to the farthest end of my beat to exchange the situation before going back to meet the other sentry on the other end. When I got at No. 3 Post, Humpy Brown did not report, so I hurried back toward the other sentry and told him that Humpy Brown did not report and I was going to call for the Corporal of the Guard. When the grand round came, the officer in charge asked me what was the matter. They hunted in the hay stack and found Brown with two arrows in his neck. They asked him why he did not call out, and he said, "Oh! I was waiting for the man to show himself before seeing me — I was going to get him." They took him to the hospital and extracted the arrows. He recovered.

'Persons on Duty at Hospital. The persons on duty were de-

tailed from the companies and no one wanted the job. The pay was extra duty pay, but the duties that the men had to perform did not suit them, so it was hard to get a man to stick to that job.

'Personal Experiences. In July, 1874, orders were issued to exchange places with the 19th Infantry, stationed in Department of the Gulf.

'Upon arrival at the West shore of the Arkansas River, a courier was awaiting the command. General Brooke, then a major, was in command of the three companies. The Major called the troops to attention, but said not to get up as they were all tired out, and then he spurted out the order that the paymaster would be in Fort Dodge to-morrow morning, and to make an early start across the river, which had to be done overhand, as there were no bridges.

'We were all invited to a dance the evening of our arrival, and I went over to see Mrs. Crowley, one of the laundresses of the Company, and asked her if I could take Katy to the dance. She wanted to know how we were going to get there. I said, "We will swim over." I took both of our clothes and rolled them in a poncho to keep them from getting wet. We dressed in swimming togs by using government drawers and shirts. We landed on the other side about 3½ miles below the Post. The water of the River is very swift. The girl was greeted by a bunch of women and wrapped in a blanket and carted off with the bundle of her clothes to her room. I went to a barracks. The dance started promptly at eight o'clock and you would hardly have known that we both had swum the Arkansas River. The next day was pay-day and a hilarious time was had. The saloons and gambling houses were wide open and in Kelly and Beatty's saloon, the Officer of the Day came in and ordered the men to Camp. One of the men, full of liquor and beer, grabbed the Officer of the Day, took his belt off and threw him under the billiard table.

'Several days later, we arrived at Cairo, Illinois, and while awaiting being transported across the river into Kentucky, I was sitting alongside of a bunky on the railroad track underneath the

edge of the car, when he turned to me and said "How did we get here, did we walk?" So you can see the state of mind the man was in from having imbibed too much "Red eye."

'... We arrived in New Orleans and marched around town every day for a week. We slept on the sidewalks of New Orleans. The orders were that if the red ball on one of the ships would go up, the artillery would open fire. The thing never happened, and everything went off in orderly condition. Refugees were housed in the Post Office building on Canal Street and were released when order was restored. Major Brooke was designated as Military Governor until the affairs could be turned over to the regular Governor of the State.'

Colonel Blair D. Taylor, retired, was commissioned assistant surgeon in 1875, having been in the Confederate Army as a boy:

'I took a contract from May 1st, '75, until June 26, '75, when I received my commission as a 1st Lieutenant and Assistant Surgeon. My first service was at Bedloe's Island, New York Harbor. . . . My next station was Fort Rice, Dakota. In July, '76, we first heard of the Custer Massacre. I was ordered out to take the place of the Doctor who was killed with Custer. We joined General Terry at the mouth of the Rosebud about the last of July, and remained in camp until the 8th of August. On that day we started up the Rosebud. On the third day, we met General Crook and his command following the Indian trail. We had started from the Rosebud with tents and wagons, now we discarded all these and took to pack-mules. Each man was allowed one blanket and a buffalo robe. We could get only one pack mule for Headquarters. I had only a few medicines and a pocket case of my own. The pack mule loaded with our rations and forage could carry no more. In due time we marched down Tongue river to the Yellowstone and camped there for a week. General Crook then proceeded South while General Terry marched to the mouth of Glendive Creek on the Yellowstone; there I got an old yellow ambulance containing some medicines and medical supplies. On the 28th of August, we crossed to the north bank of the

Yellowstone and made a night march towards the North, and a dry camp. South of the Yellowstone there was no game. The country in which we now were was overrun with antelope, deer, prairie chickens and buffalo. We ran into a large herd of the latter and killed enough to supply us with fresh meat for some time. We then marched Northwest to Wolf's Point on the upper Missouri. We crossed to the north bank of the Missouri, and marched home by way of Fort Buford, arriving about the end of September. I had been at home about ten days when I was ordered to Fort Lincoln to go with General Sturgis down the river to Cheyenne to disarm the Indians, and take away their ponies. We returned from this expedition about the middle of November in 20 degrees below zero weather. In 1877 I received 40 or 50 wounded men from the fight on Bear Paw Mountain. . . .'

A sample of the difficulties experienced by medical officers is found in General Francis Roe's account of 'Custer's Last Battle.'¹ After speaking of Reno's relief he says:

'We started about eight o'clock in the evening with four men to a litter. About fifty or sixty feet was all that they could walk without stopping to rest, and the poor wounded fellows couldn't stand being let down to the rough ground. In a little while it was necessary to use eight men on each litter, so that four men could put the poles on their shoulders.

'As they tired, they were relieved by four others who walked alongside; thus we had eight times fifty, or the greater portion of the detachment, carrying the wounded. Traveling along slowly, we made only five miles to the first halt, between one and two o'clock in the morning; and still had some eighteen or twenty miles to the mouth of the river. All day, the 29th, we were occupied in making litters, which were thus constructed:

'Cottonwood trees about twenty feet long were cut down for poles, the dead horses were skinned, and their hides pegged down on the ground; long lariats cut from them were then laced between the center of the poles to make a bed. A mule was put between

¹ Copyrighted, published by Robert Bruce, New York, 1927.

the shafts in front, and the same in the rear; the poles were supported by the rigging of the pack saddles, and an infantry soldier led each mule. The wounded were placed on those crude litters, and carried along as comfortably as possible.

'Slowly and painfully we marched all that night, and just before daylight of the 30th arrived at the mouth of the Big Horn, where the wounded men were put aboard the boat. For five or six miles we could see it actually waltz down the river, striking the banks repeatedly, first the stern and then the bow.

'The Far West ran a little over seven hundred miles to Bismarck in about seventy hours. Information of Custer's Last Battle was carried in that way, and also by "Muggins" Taylor, as a courier, two hundred miles to Fort Ellis, Montana, that via the latter being the first to reach the East by telegraph.'

Colonel George W. Adair, retired, has written of his service in the Medical Department in the seventies and eighties in part as follows:

'*Military service:* I joined the Military Service October 5, 1874, at Newport Barracks, Kentucky, on a contract. Was commissioned First Lieutenant and Assistant Surgeon November 10, 1874, and ordered to the Department of Texas the ensuing March. The itinerary of "The Shortest Usually Traveled Route," more than half a century ago may be of interest: — By rail to Hemstead and then to Austin and then to San Antonio eighty-four miles by stage. Made the stage journey in fourteen hours, including stop for dinner. This was the best time and best stage line ever found in Texas. Was ordered to Ringgold Barracks. Again "The Shortest Usually Traveled Route" was east, thirty-five miles by stage to the end of the new railroad, thence to Galveston, and thence by steamer to Brashear, now Morgan City, and then by steamer to Point Isabel, and twenty miles by rail (narrow gauge) to Brownsville. There I joined a Paymaster's train to Ringgold. He had an escort of sixteen infantrymen. My first field service. We camped one night on a pretty grass plot. After night there was a Texas shower, and soon there was six inches of water in our

tents; and I made my first military mental note: When you see a green spot in Texas ask why, before you camp there.

'In June, 1875, I received orders to proceed to Fort Duncan, Eagle Pass, and report to Colonel Shafter for field service. The Quartermaster furnished transportation by ambulance. The driver missed the Saus Ranch — where we should have camped for the night — and we were lost in the chaparral. We camped at one o'clock in the morning. The driver hitched his mules to the end of the tongue of the ambulance, which was broken off short during the night. (Second Military Note: The end of the tongue is not a proper place to hitch mules.) With a hatchet the driver made repairs and kept on going until we came to a Mexican ranch where we bought milk and cheese. Note: An American ranch may have nothing, but one can always buy something at a Mexican ranch. We asked directions to Laredo. All the younger men shook their heads, but an old Mexican said, "Si," and pointed. It was an old trail by which thrifty Confederates had exported cotton during the early part of the Civil War. After a few miles we came to the road from Corpus Christi to Laredo; and we reached Laredo on schedule time.

'Up to this time one armed soldier had ridden with the driver, but the cautious Captain in command at Fort McIntosh said this armament was not enough and furnished me with a carbine and sundry rounds of ammunition.

'From Fort Duncan, Colonel Shafter sent me to Fort Concho where the expedition was being assembled. Here I received my horse and began my bona fide mounted service.

'Sixteen miles a day is a long march for Infantry when in no hurry; and the march to Fort Concho via Fort McKavett was useful training to fit me for the more strenuous service on the Staked Plain. Before December I was destined to ride twenty-five hundred miles. In those days cavalry invariably marched at a walk, marching fifty minutes and resting ten. When we came off the plain in December, the last march from Five Wells to the head of the North Concho, we marched from sunrise till near

sunset — forty miles — a feat that would have been impossible for me at the outset.

‘This looks easy, but watch a fine and sturdy Missouri horse break down. He appears in prime condition; but it is his first season in military life; his diet has been suddenly changed from dry hay and grain to one of exclusively green grass. He is walking along quietly in the column when he suddenly begins to sweat and then to tremble. At the first symptom his rider dismounts and passes the reins forward to the man ahead to have him lead. The man ahead must soon drop the reins or his own horse will give out. At this stage, regulations condemn him to be shot. Personally, I am glad to testify that I have never known of a horse being shot under these conditions. Humanity is stronger than army regulations. His saddle and bridle are removed and he is turned loose to his own devices. If by rare chance an Indian gets him, he can be of little use. Probably he will follow along the trail and late at night will stumble into camp. Hence, at the earliest opportunity, he will be sent to a military post and turned over to the Quartermaster as unserviceable. After his case has been considered he will be sold at public auction. There is no deception; the horse is sold “as is.” Frequently the purchaser thinks he knows more about horseflesh than “them army fellers,” and pays good money for his conceit. Early in the campaign such a horse was seen running along with a herd of buffalo. Mexican guides were sent out and soon brought him in. Colonel Shafter, weighing two hundred and twenty-eight pounds, adjusted his saddle-blankets so as not to chafe the scars from old saddle galls and rode him on alternate days throughout the campaign and brought him in in good condition, although several lighter cavalry officers lost their private mounts. His experience with the buffalo had taught that horse to eat grass enough to support a strenuous life.

‘The command was assembled near Fort Concho and the eight troops of Cavalry, two companies of Infantry, and the Quartermaster’s train of sixty six-mule teams — the finest mules that I have ever seen — “Headquarters Transportation,” with numerous

broncho mules for pack animals, presented a spectacle quite imposing to a novice who found himself Chief Surgeon with an Assistant Surgeon and a Contract Surgeon and a Hospital Steward under his command.

'A few mild cases of scurvy, the only ones I have ever seen, showed that the disease may occur in a well fed soldier with plenty of fresh meat in his diet. The treatment, simple and effective was advice: "Go to the Commissary and buy and eat tomatoes."

'I crossed the Staked Plains five times with a mounted command, always by a different route. The first time we reached the Pecos after making ninety miles without water. We marched two hundred miles down the river to Horsehead crossing, where we received supplies from Fort Stanton. Critical cavalry officers kept tab on their infantry commander and said we had made eleven dry camps marching down a river. The Pecos makes some wonderfully wide bends. On our return, forty miles north of the White Sand Hills, Apache Indians attacked our camp. There were no casualties. It is noted as being the only occasion, in more than thirty-four years of active military service, that I have ever been exposed to hostile fire.

'In the summer of 1876, I was ordered to Fort Richardson, Texas. Here the "Wild West" was having a parting revelry. The extermination of the American Bison had begun, two hundred thousand buffalo hides passed through Fort Griffin, the next military post, nearer the Staked Plain where the execution was done.

'At the little town near the latter post social conditions had been strained the previous winter. The ranchman always prudently uncoiled his lariat and carried the free end with him into the saloon. The time came when, after drinking his beer, he would find his lariat cut and his horse missing. The friends of law and order took action. Every morning for eleven days a man was found hung. Such reduction of population would have been of little effect, but all the fellows who felt that they ought to be

hung bolted for the Cantonment in the Panhandle, taking their sweeties with them.

'The next year I went to Fort Griffin on Court-Martial duty; the little town near the Post — it was called "Scab Town" then — I hope it has acquired a better name since — was still in its hey-day. The one street on either side was lined for half a mile with small frame buildings, where the buffalo hunter and cowboy could find refreshment and joy. The liquid refreshments were supplemented by music, dancing and the drama. Art and poetry were not neglected. I will record a sample; on one sign was an artistically drawn and classical straw bee-hive with bees flying around. Underneath was this legend:

Within this hive we're all alive,
Good whiskey makes us funny;
And if you're dry, step in and try
The nature of our honey.

At night gasoline torches made the street a broad white way. . . .

'After the Battle of Wounded Knee, the troops marched home over a snow-covered prairie. Snow-blindness was almost universal. A non-commissioned officer with one hand over his eyes would come to the hospital leading a string of men with the other hand. The wards were filled and the windows of the barrack-rooms darkened for those treated in quarters. . . .

'In an humble way, I raised the status of dentistry in the army. I had extracted a few teeth in civil practice before entry into the service; but was by no means an expert. At the time, by general custom, the Hospital Stewards extracted the teeth. Observing their operations, I felt convinced that the ancient barbers did better work. An inward reaction prevented me from assigning to a steward, work that I could do better myself. It was not conscience. To see a steward shutting his eyes when he pulled, and listen for the expected crunch or snap of a crushed or broken molar — to use expressive modern speech — got on my nerves. Did I not sacrifice many teeth that might have been preserved for several years of usefulness by filling? Yes. Dentists were scarce

on the frontier. An annual visit by a traveling dentist was all that could be expected, and that was uncertain. The dentist was always welcome and an office provided for him at the hospital. A busy week in the garrison showed that I had left some business for him. Upon the whole, I believe that I did more good than harm with my inexperienced dentistry. . . .'

Dr. George M. Kober has contributed a sketch from which the following extracts are taken.

'In the fall of 1872 the writer was detailed for duty in the main office of the Surgeon General, located in the old Riggs Bank, northwest corner of Pennsylvania Avenue and 15th Street (opposite the Treasury). Surgeon General Joseph K. Barnes and Assistant Surgeon General C. H. Crane with a few Executive clerks occupied four modest rooms on the first floor of the old bank premises, in the yard was a small annex building, which housed a printing shop, a distributing office for Medical Periodicals and Documents, one or two rooms for clerks; a commodious stable in the yard housed the horses and vehicles of the office.

'On the second floor fronting on Pennsylvania Avenue, were several modest rooms, two of which were occupied by Colonel J. H. Baxter and clerks, engaged in the compilation of the statistics of the Provost Marshal's Office, and in the duties of Chief Medical Purveyor. Dr. John S. Billings, who was the Librarian and Disbursing Officer, with two or three clerks, occupied rooms on the north side, one of the largest rooms, probably 20 by 24 feet, contained all the files of the Surgeon General's Office, and four desks for clerks. Another room was occupied by a former veteran chief clerk. I do not recall the exact number of the clerical force, but I doubt whether there were more than 15 civilian clerks and 100 hospital stewards acting in a clerical capacity in 1872.

'It was my agreeable duty to read over all the correspondence on file in the S. G. Office from 1812 to 1874, and make a complete index of everything worthy of preservation. In this way the important reports by William A. Beaumont on the case of Alexis

St. Martin came to light, as also numerous reports on epidemics of cholera and yellow fever. In 1873, Major Harvey E. Brown compiled the first history of the Medical Department in the same room where I worked.

'In November, 1874, I was ordered to a frontier cavalry post at Camp McDermitt, Nevada, located about eighty miles northeast from the town of Winnemucca. The post was established in 1865, and permanent buildings were erected in 1866-67. I obtained the construction of a new hospital at Camp McDermitt. The cost was \$2216.06. The hospital was a stone building 30 by 28 feet, divided in two parts, one of which was a ward 24 feet by 17 by 8 feet; the other was subdivided into a dispensary and kitchen. The ward was well lighted and heated, ventilated by an open fireplace and contained four beds, giving to each 856 cubic feet of air space. There was no washroom. Both here and at Alcatraz all surgical work had to be done in the Ward, and the need of an operating room was keenly felt.

'In the fall of 1875, I served with a squadron of the First Cavalry in the southeastern Nevada expedition against hostile Indians. Our supply table was liberal, but in no way comparable to the equipment furnished now for hospital and field service, and I often wonder how we got along.'

The Army women of the seventies merit a book of description and praise, but unfortunately room cannot be made for it here. A number of them have written very informingly and delightfully of the life: Mrs. Custer, Mrs. Bingham, Mrs. Roe, and others; and Owen Wister has drawn a Mrs. Sterling so true to her type and kind as to be almost certainly pictured from life. They went where their husbands went, from log house to 'dobe, riding days and weeks behind marching columns, not infrequently carrying revolvers for self-destruction in case of Indian capture. They slept in tents, had babies, usually a good many, in the wilderness, reared them in the fear of God and Indians, but of nothing else, made homes under most adverse conditions and on the niggardly pay their husbands drew, hunted, fished, danced, picnicked, im-

provided plays and entertainments, made over dresses, were ranked out of quarters with their husbands and occasionally got a new hat or dress by mail from the East. Perhaps they had even more thrills from the auctions of household effects. Most changes of station involved wagon and stage transportation and the allowance of baggage was very small. When orders came for an officer to move, the household effects were put up at auction and emotions were loosed, tears at parting with cherished articles, gloating over bargains, fear as to whether furniture could be obtained at the next place, pride in getting a comfortable chair or some pretty curtains.

Hospitality, never failing and generous, was an outstanding characteristic and, to such people and under such conditions of life, a frequent delight.

They were the fine and rare exemplars of gentility and culture in their rough, hard-drinking frontier world, and they shared the courage, the cheer, and the adventurous spirit of their rougher neighbors.

In 1875, the Surgeon General issued 'A Report on the Hygiene of the United States Army, with descriptions of Military Posts.' Every post in the Army was described as to its location, dimensions, water supply, and a description of each building in it. It is dry and uninteresting except as showing how the Army was cared for at that time. In general terms, it was cared for as little as possible. The posts were all small. A few of them, such as Fort Warren and Fortress Monroe, were real strongholds, built of stone and serving as coast defenses. In them the officers were housed in casemates. The great majority of the posts, although called forts, were not fortified. Barracks and officers' quarters were usually built of logs, of boards or of adobe; they were small and crowded. As a rule the commanding officer of a post had a rather spacious house, most other officers rather small ones. Lieutenants' sets of quarters usually consisted of two or three rooms. The houses had no bathrooms, no running water, no central heat, no plumbing. The water supply was commonly

hauled by wagons to barrels in the rear of the houses. There was no artificial drainage. The artificial lighting was by candles or oil lamps.

At McPherson Barracks, Atlanta: 'It has never been permitted to paint the exterior of any building at the station, and as a consequence their weather beaten aspect is gloomy and desolate in the extreme. As a further and more important consequence the officers' quarters under heavy rains leak badly, defacing the walls and in some cases damaging the furniture, as well as making residence very unpleasant. . . . There are enough heating stoves to give one or two to a house. The most of the officers are obliged to supply their own cooking stoves. An application made to the chief quartermaster for enough for all of the officer's families, in the fall of 1873, was rejected on the ground that as the kitchens had fireplaces, cooking stoves could not be allowed.'

Not only were bathrooms lacking at all posts, but water itself was often scarce or distant. Thus, at North Platte Station, 'during the summer the men bathe in the Missouri River, two miles distant. There are no arrangements at the post for bathing in summer or winter.'

General Tasker H. Bliss graduated from West Point in 1875. Asked as to the status of medical officers in the opinion of the line officers of the seventies he said, 'To tell you the truth, most of the line did not regard them highly, and it was a common saying that they had nothing to do but to confine laundresses and treat the clap.' General Bliss then recalled his contacts with medical officers of those years, and found them nearly all alert and cultured gentlemen. However, some of them, like line officers, lived too narrow and isolated lives, used too much alcohol, as did many men of their day, and occasionally met disaster in that line.

Twice in these years Congress adjourned without passing the Army appropriation bill. In 1879, the fault was corrected by a special session before the new fiscal year began, but in 1877, it was not corrected until November 21st, and officers and men were without pay for six consecutive months. Of course this was

a great hardship upon them, as most of them had nothing beyond their pay and lived close to the margin of that. The banks throughout the country loaned money to officers, who as a class have always had high credit, but the payment of interest on daily expenses was a hardship. For the married enlisted men the lack of pay was even more serious.

There were numerous Indian campaigns and still more numerous scouting expeditions. The most disastrous year of the decade was 1876, when 267 officers and enlisted men and one contract surgeon were killed, all but twenty of them in the massacre of Custer's command at Little Big Horn, Montana, but there were 15 killed and 67 wounded in the next year, 77 killed and 132 wounded in that ending June 30, 1878, and 14 killed and 23 wounded, in 14 engagements to the end of June, 1879. Those reported killed were killed on the field. Many others died of their wounds after a few days. The following table gives important information:

YEARS ENDING JUNE 30	STRENGTH OF ARMY	SICK RATE PER 1000	DEATH RATE PER 1000	DISABILITY DISCHARGES PER 1000
1871.....	31,973	2,087	17.7	36
1872.....	26,595	1,846	16.	35
1873.....	27,364	1,574	17.	35
1874.....	28,144	1,793	13.5	33
1875.....	24,143	1,683	11.5	28
1876.....	23,683	1,724	23..	26
1877.....	25,359	1,755	11.5	31
1878.....	22,689	1,516	12.7	28
1879.....	23,663	1,763	12.4	30

The army was about one sixth to one fifth its present size, the sick rate from two to three times, the death rate three to six times, and the discharge rate one and one half to two times as great as at present, comparisons eloquent of the progress made since in prevention of sickness and saving of life.

Mr. Charles Parker has contributed recollections of his life as an enlisted man:

'I enlisted at New York in September, 1880, and was sent by rail to a place somewhere near Ogden. The detachment was met

by wagon train escort, six-mule teams which carried only rations and forage for the animals. We walked the six hundred miles to Helena, Montana Territory.

'I was like a boy free from school. The limitless view bounded only by mountain ranges in the distance, the covered wagons, such as I had never seen before, to each of which six mules were attached, driven by one man astride of the nigh wheeler and all six under his control by one line, were to me revelations; those days on the march a grand vacation. The coming into camp and preparing the evening meals, the breaking of camp in the early gray mornings, the smell of the coffee boiling, the emphatic coaxing of the mules by the mule skinnners, all were interesting. There were no roads, only a trail over which the wagon master took us without any apparent doubt where he was going. The trail was for about 600 miles very dusty, but not any discomfort was felt from that, as we could walk ahead or to the windward side. A stream was always a welcome sight; a recruit generally carried an empty canteen. We had no overcoats and but one blanket. The shoes were of very coarse leather, uppers fastened to the soles by brass screws. These to me were very uncomfortable but I solved the matter of fit by walking through a creek until the uppers were thoroughly soaked, walked the whole day in them, and so got a foot form and comfort. Many were the blisters but these were alleviated by using ordinary government issue soap on the skin and on the outside of the socks. No medical officer was with the outfit, but some old timers were and they knew how to take care of themselves. Overcoats were issued at Fort Shaw. These were of blue shoddy cloth, the one I drew had a standing collar and, I think, four small capes, three anyhow. It reminded me of the old-time London cabby as featured in some of Dickens's works. Arctic overshoes, heavy, with two straps were issued, and for field service and in very cold weather gauntlets and caps with ear flaps of muskrat skin, and buffalo overcoats were issued. There was also an overshoe, the uppers made of softly tanned buffalo hide, hairy side in, the soles made of raw-

hide, these were very clumsy but were very comfortable on dry snow, but useless for a mounted man, as the stirrup would not accommodate them.

'We did route marching, go as you please, and arrived in Helena early in November. The detachment camped in a corral and was subdivided into units for assignment; mine, Company K, was to locate a new post, Fort Maginnis, Montana, and was sent first to Fort Shaw. At Benton the thermometer was 63 degrees below zero, and the Missouri froze over in one night, allowing escort wagons to cross. We joined at Maginnis early in the spring of 1881. During the preceding winter the company had built log huts for two officers, a company kitchen, log quarters for the company, commissary and quartermaster storehouses, corral, etc. The logs were cut from nearby stands of pine, men cutting under guard of their comrades in buffalo overcoats. A log hospital ward was also built, supplemented by hospital tent dispensary and office. I was appointed a hospital steward, 2nd class, at Fort Shaw.'

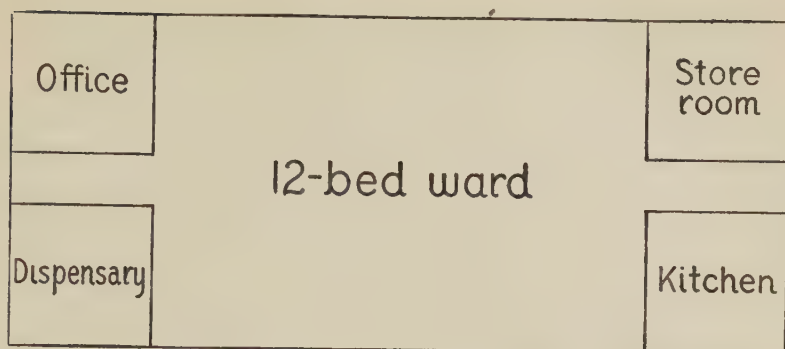
General Walter D. McCaw tells of accompanying the 9th Cavalry on changing station from Fort Riley, Kansas, to Fort Laramie, Wyoming: 'On the march we took our own time — six or seven weeks marching, in the summer of 1885. There were nine troops, band and Headquarters, and all the women and children of the regiment, who traveled in their own carriages and had their own wagons for household goods, a long and queer-looking caravan of all sorts of vehicles, drawn by every variety of horse and mule. They had to get away first every morning and be well on their way before the column took the road, followed by the wagon train. I had no assistant, no steward or clerk, but only one four mule ambulance with its driver, and one negro orderly from the Regiment, whose duty was to look after my personal comfort. This he did in a most satisfactory manner, and before the journey was over, I found myself using a number of portable camp comforts, which I had certainly not brought with me.'

Colonel William H. Arthur, retired, contributed the following reminiscences:

'In 1880, when I entered the service, the medical journals were full of articles dealing with Lister's teaching, and the methods he advocated and already, though many old surgeons ridiculed his theories, many operating rooms were furnished with a carbolic spray apparatus, all operations being done in a fog of atomized diluted phenol solution, but the results I saw were little if any better than without it.

'I was ordered to Fort Washakie, Wyoming, and it might be of interest to describe the hospital at that post, as it was typical of the great majority of post hospitals fifty years ago and long afterwards. Fort Washakie was 150 miles from the nearest railroad station, on the Shoshone and Arapahoe Indian reservation on the Little Wind River. I was there two years without ever seeing another doctor of any kind and had to give medical care to the small garrison, to all the Indians on the reservation, about 4000, there being no agency doctor on duty during my stay, and to all the cowboys, miners and odds and ends of civilians found on the frontier, who came in for a radius of 150 miles, and this was all charity practice, for the people were very poor. The surgery was amputations for frost-bite, gunshot wounds, fractures and dislocations. The Indians preferred their own medicine men as a rule and I was not called in to attend a great many of them, though I did see a few almost daily.

'The hospital was a log building chinked with mortar, of exceedingly primitive architecture "built by the labor of troops." It was typical of the frontier post hospital of fifty years ago, a long parallelogram of five rooms, a ward of 12 beds, an office, dispensary, kitchen and store-room, heated by wood burning stoves, lighted by candles and ventilated by leaks in the chinking all around the windows. The water supply consisted of two or more pork barrels outside the kitchen which except in winter were filled from an *acequia*, an artificial brook by which water was led to the post from higher up the Little Wind River. In winter the thermometer frequently reached - 43, and on an occasion went down to - 57. Then the water supply was simply ice or snow



melted on the kitchen stove. The Hospital Corps was not organized until 1887, and for nursing our hospitals were dependent on: first, hospital stewards, who were regularly appointed staff N.C.O.'s permanently attached to the Medical Corps. They were, with few exceptions, excellent men, pharmacists, record keepers, property men and general managers and wardmasters. They were indispensable and I came to know and like and admire many of them; second, "hospitals attendants," private soldiers detailed on extra duty from the companies. Very naturally the company commanders were not anxious to see their best men detached from their organizations, and we generally were supplied with the worst they had and on them we had to depend for the nursing service, working and policing of our hospitals.

'Here is an illustration of what we had to contend with. At this post, Fort Washakie, a cavalry soldier was accidentally shot in the right thigh, anterior aspect, upper third. The bullet (a 45 leaden pistol bullet) passed across the limb in front of the femur, but tore through the femoral artery and it was necessary to tie the external iliac just below Poupart's ligament. This operation was done in the ward on a mess table borrowed from one of the troop barracks, for our three attendants ate in the kitchen and we had no mess tables. Collateral circulation was not established and soon it was evident that gangrene of the foot and leg was inevitable. While waiting for a line of "demarcation" to form between dead and

viable tissues, I was called to the hospital one night to find that secondary hemorrhage had set in. The only chance it seemed to me of saving the man's life was amputation at the hip-joint.

'At night, by the light of a few candles the operation was done. The anæsthetic was given by the hospital cook, a private of cavalry. The hospital steward recently appointed fainted at the first stab of the knife, was shoved under a bed and left to come to in his own good time. A patient in the ward, a cavalry private, crawled out of bed, told me he had worked in a drug store before enlisting and offered to help, and he did very well, and the disarticulation was soon completed. The patient died before day-break.

'During my two years at Fort Washakie, I did quite a little surgery among the civil population, especially amputations for frost-bites, and to my surprise, the operation wound uniformly healed by first intention. I believe this was due to the fact that the remote, sparsely settled dry country itself was sterile, that no pathogenic organisms had been introduced and that though I was surgically dirty, I couldn't infect my cases. I do not remember ever having seen any pus all the time I was at that station.

'Sanitary questions didn't give us much concern at Fort Washakie, which was the healthiest post I ever saw. Pneumonia was the disease that was dreaded and fatal, but I saw not more than five or six in all. At Fort Douglas, Utah, my next station, things were very different. There was a forty-bed stone hospital with some modern improvements, but even here the building was very primitive. There was no laboratory or operating room, no running water except from a hydrant outside of the kitchen, no water closets. In this hospital we were allowed coal oil lamps instead of candles and there was a mess room for the attendants and ambulant patients and the building was heated by a central hot-air heating plant. It was considered the finest military hospital in the Department of the Platte, if not in all the west.

'The only happening of professional interest in the 18 months I spent at Fort Douglas was a serious outbreak of typhoid fever.

While Major Meacham was on duty he hunted diligently for the cause of this epidemic, and made many recommendations, all, it seemed to me, practical and intelligent, but in those days sanitary reports were addressed directly to the post commander and stopped there, generally being filed in the waste basket. The commanding officer at Fort Douglas was a civil-war hangover with a grievance, a drinking man, who when "in liquor" was irritable, profane, abusive and unreasonable and would listen to no one. He resented any adverse criticism of sanitary conditions, and finally ordered Major Meacham to stop sending in any sanitary reports.

'In contrast to the case at Fort Douglas, I might note the case of a post in Arizona about seven years later, after the requirement that the sanitary report be forwarded. Soon after arriving at this post I found bathing facilities entirely absent from the barracks occupied by colored cavalry and infantry. I noted this fact on the next sanitary report, which was returned with the remark that a large general bathhouse was under construction. I asked the post quartermaster where it was, and he showed me four tent pegs stuck in the ground to designate the site of the bathhouse, which he told me had been thus for six or seven months. "Was money appropriated for it?" I asked. "Yes," he said, "but it has all been spent"; and he pointed out an extension of the C.O.'s quarters and two bay windows added to the original building. In my next sanitary report I reopened the subject and reported that no progress had been made on the bathhouse. The commanding officer, compelled to forward my report, sent for me and told me to destroy the report and send in another, omitting all mention of the bathhouse, adding that my remarks were insubordinate, criticized my C.O., etc. "No," I said, "I criticize only sanitary conditions, as it is my plain duty to do." Somehow money was forthcoming and the bathhouse pushed to rapid completion, but after that my life at that post was not very pleasant. With the old method, my sanitary report would have been put in the waste basket. This is merely given as an illustration of how the

enforced forwarding of the post surgeon's sanitary report (1885) worked.

'Returning to Fort Douglas, let me give an illustration of some of the difficulties of running a military hospital forty-five years ago.

'One night a 1st Sergeant, in the sixth week of typhoid fever, had relapsed. I saw him at about 11 P.M. and found him in urgent need of steadily repeated stimulation. I gave the night nurse (a private of the 6th Infantry) a bottle of brandy and a measuring glass, telling him to give the patient one ounce every two hours. When I returned to the ward at daybreak the patient was dead, the nurse drunk, snoring on the floor, the bottle empty. He had not given the patient a single dose.

'I sent the man to the guard-house and put charges against him. The C.O. released him as soon as he heard of it, sent for me, and told me in effect: "You may give orders to my men if it amuses you, but no staff officer has the right of command, and my men may obey or disregard your orders as they see fit. This man is not guilty technically of neglect of duty, for nursing sick men isn't a military duty."

'The introduction of the monthly sanitary report (in 1885) and the establishment of the Hospital Corps very soon brought about a vast improvement in the sanitary conditions of posts and the care of sick and wounded in hospital. No one, who did not have experience of the difficulties of medical officers before their introduction, can appreciate their great value to the Medical Corps and the service generally.'

The following extracts are from reminiscences of the eighties by Colonel Henry P. Birmingham, retired:

'I was informed that I would be sent to Fort Buford, at the mouth of the Yellowstone, and that if I were fortunate, I might catch the last boat up the river; otherwise I would go overland by mail wagon from Bismarck. My contract was dated November 2, 1880, and ice was forming in the river. I was not fortunate and made the trip by wagon and I do not think I will ever forget

it, as it was very cold, and a springless wagon is not a restful thing to ride in. We stopped at night at camps where wood was cut for the steamboats. The "Wood Hawk," as he was called, was about as tough a citizen as the country afforded, and it afforded some fine specimens of that genus in those days, but I got through with nothing more serious than an attack of pediculosis. We were eight days on the road, and averaged about thirty miles a day. Fort Buford was located about one-fourth mile from the river which, at that point, made a long, tortuous bend which was twelve miles in extent by river and about two miles across the neck of the peninsula so made. . . .

'This neck of land was almost completely submerged early in June each year and, as the water receded, it left stagnant pools or lagoons which bred mosquitoes by the billions, and made this the most mosquito-ridden spot, for about four months, I have ever experienced. During the mosquito season it was considered a breach of the proprieties to enter a house without first carefully brushing the mosquitoes off of your clothing. . . .

'In July, 1879, I received orders to proceed up the river to Camp Assiniboine, Montana.

'The trip from Buford, made on the steamer Red Cloud, was full of surprises and interest, except at night, when we tied up at the bank, as the crooked and ever varying channel made it unsafe to run after dark. Then the hordes of mosquitoes made those not furnished with head nets seek cover on the inside. As we neared our destination we ran into the last big herd of buffalo in the country. We were three days passing this herd, and there must have been a million of them. Some were grazing not far from the bank and others were seen as far as the horizon. In less than five years from this time the buffalo were practically exterminated. . . .

'Early in May, 1881, we marched overland from Garland, Colorado, to the Cantonment on the Uncompahgre River, on the Ute Indian Reservation, Utah, a distance of about two hundred miles, and were about twelve days *en route*. The road led through

the heart of the Rocky Mountains, and in spots required all the skill of the old, experienced officers and wagon-master to get the command through, and quite often mule-power had to be reinforced by man-power. The Medical Department command consisted of two Contract Surgeons, one with the infantry and one, with myself, with the cavalry, one Acting Hospital Steward, two hospital orderlies; and two ambulances. As I was the senior medical officer, I had to make requisition for medical supplies for the command from the hospital at Garland, and supervised the medical service on the march. As this was the first service in the field, I was for awhile unduly perturbed by a sense of my responsibility, but I was fortunate in getting it early and plenty of it for, after the ending of that campaign, in the following December, everything afterward seemed comparatively easy. The duties of a medical officer of those days were largely or wholly professional, i.e., medical and, aside from the monthly sanitary report, the medical officer was a doctor in uniform, differing very little from his confrère in civil life, and his evolution to the status he now occupies was a slow one, covering many years.

‘Upon the arrival of the command at the Cantonment on the Uncompahgre, General Ranald S. Mackenzie assumed command of all the troops and awaited the arrival of the Commissioners to arrange terms with the Indians for their transfer to the Uintah Agency in Utah.

‘The Indians finally absolutely refused to move, and serious trouble was apprehended. General Mackenzie, upon being informed of the action of the Indians, told the Commissioners he would assume charge of affairs, and sent for the Chiefs. From long experience with Indians, he curtailed the talking and told them he would give them twenty-four hours to decide what they would do. That night a cordon of troops was thrown around their camp, and when the Indians realized their position the Chiefs hastened to Mackenzie, telling him they were ready to move.

‘It was rather a sad sight to see those Indians hurriedly depart

from a country that had been their home for generations, but it has ever been the fate of the Indian whenever the white man wanted his land.

'After the Indians were well on their way to Uintah, news came that a part of the Sixth Cavalry, under General Eugene A. Carr, had been massacred by a mutiny of its Apache Indian scouts on Cibicu Creek, and the cavalry was ordered to proceed in haste to Arizona. We made a forced march to the railroad at Gunnison City, and entrained there for Holbrook, New Mexico, the end of the Atlantic-Pacific road at that time, and marched from there to Fort Apache, Arizona.

'The report of the massacre proved to be erroneous, and was due to the fact that the scouts, after their mutinous attack failed, made an attack on Fort Apache, General Carr's headquarters, garrisoned at the time by a small infantry command. The Indians were finally driven off, but their action in attacking the post had led to the belief that they had succeeded in annihilating Carr's command, and Department Headquarters was so notified.

'The mutiny of the scouts caused many other Indians to leave their reservations, and the Fourth Cavalry, to which I was attached, remained in Arizona until the latter part of November, when they took up the march for posts in New Mexico. The march ended at Fort Stanton, New Mexico, and I was ordered to report for duty at Fort Gibson, Indian Territory.

'Gibson was a two-company infantry post, in the so-called Cherokee Nation. It was noted particularly for being in the heart of a hunting country; turkey, prairie chicken, quail and duck being found, in season, within a few miles of the post, and deer in the hills and river-bottoms farther out. It was great sport and thoroughly enjoyed by the whole garrison, either as participants in the sport or as beneficiaries of the gamebag.

'I remained at Gibson about a year and then was ordered to Fort Bayard, New Mexico, back to the Indian country from which I had recently come, and to which I gladly returned. Fort Bayard was about a day's cavalry march from one of the trails

followed by hostile Apaches on their frequent raids between the White Mountain Reservation in Arizona and Mexico, to which latter they fled when pursued by the troops, leaving a bloody trail behind them.

'Life at Bayard was very agreeable when the command was in the post, but a good part of the time the cavalry, at least, was on the trail of the fast-moving hostile Apache. I use the word "hostile" advisedly, for the reason that for many years the only tribes of the many known as Apaches who went on the war path were the Warm Springs of New Mexico, under Victorio, and the Chiracahuas under Juh and Geronimo.

'My first tour of duty — four years — in the West ended in May, 1885, but the Apaches under Geronimo again left the reservation, for what proved to be the last time, and started on a hostile raid through Arizona and New Mexico, for the Mexican Border. Realizing that this would probably be our last opportunity to participate in an Indian campaign, Lieutenant Matthias W. Day, Ninth Cavalry, who was on leave at the post, and I wired Department Headquarters for orders to join troops in the field, which was granted, and we were ordered to report to General Crook at Fort Bowie, Arizona.

'General Crook organized two commands to pursue these Indians across the Mexican Border, to one of which I was attached. There was considerable delay in starting, as some negotiations between Washington and the City of Mexico had to take place before we could cross the line. Major Davis's command consisted of his cavalry troop of about sixty men and about the same number of Apache Indian Scouts, who were regularly enlisted in the United States Army. These Indians were employed both as trailers and fighting men, but they had to be allowed to fight in their own way, after the manner of their fellow Indians who opposed them, and it was mostly each man for himself.

'My medical outfit consisted of one old-time ironbound oak medicine pannier which, when fully packed, weighed between seventy-five and a hundred pounds, was filled with the standard

medical supplies of the day and contained a pocket surgical case. In addition I took along two boxes of extra supplies and a field operating case; the contents of the boxes were largely extra dressings, with some chloroform. This outfit fitted nicely on a small pack-mule, weighed about one hundred and fifty pounds and, of course, could be taken anywhere in the mountains.

'We left Fort Bowie early in June, 1885. Our instructions, in a general way, were to proceed to Mexico, get on the trail of the hostiles, follow them unceasingly, fighting them whenever we found them. The country where we expected to look for them, the Sierra Madre in the State of Sonora, was considered to be the roughest and most inaccessible mountain country in the North American Continent and, as the Apaches were all mountain Indians, we expected to use our Indian scouts as trailers and fighters as, when closely pursued, the cavalry would be unable to keep up with the rapidly moving hostiles.

'We remained in the mountains of Sonora about four months, and had two running fights; in one of which we captured about twelve or fifteen of their women and children. We had great difficulty in locating them, originally, as they broke up into small bands for the purpose of raiding on the Mexicans. We heard of them appearing at widely separated points; but when led to them by the Mexicans, if we found anything at all it was generally an old trail which it was futile to try to follow. On one of these side scouts, however, led by Lieutenants Day and Walsh, they ran into quite a large party, under Mangus Colorow, one of Geronimo's lieutenants, and captured the women and children referred to. We were constantly on the move, with the exception of about two weeks, when we were compelled to go into camp and send the pack-train back to the Border for rations.

'Early in September, while on the trail leading to Nacosari, we suddenly encountered an American man and woman, on foot on the trail, who were very badly frightened when they saw our Indians, supposing them to be hostiles, and were preparing to open fire on them when Lieutenant Day and I rode up. We found

out they had been in charge of a burro pack-train of twelve animals, with two men, *en route* to an old Mexican mine when they were ambuscaded. The two men were killed, they themselves opening fire on the Indians and retreating down the cañon, finally escaping. We had met them on the third morning after the attack and they had had neither food nor drink in that time and were nearly dead of thirst. After giving them water, carefully, and afterward food, they were soon refreshed and took us back to the scene of the encounter. We found the body of one of the men but there was no trace whatever of the other. Our Indian scouts told us there were about twenty hostiles in the party, commanded by Chihuahua and that they appeared to be headed for the American Border. As it was highly important that they should not cross our border without our getting word to our troops, and as they had two days' start on us, Major Davis ordered Lieutenant Erwin to proceed to Lang's Ranch with the cavalry, taking the men and woman with him while we took the hostiles' trail with our Indian scouts, as the country was practically inaccessible to cavalry. We traveled from daylight until dark, over the roughest country the hostiles could find, to Guadalupe Cañon, on the Border, where we put Captain Martin, Fourth Cavalry, on the trail, as our animals and men were about completely exhausted and only six or eight hours behind the Indians. We had sent a courier to Lang's Ranch twenty-four hours before, to warn the troops and settlers of the approach of the hostiles.

'We had a short fight with the Indians, in the Terris Mountains, in which we lost one killed and had one severely wounded. What casualties the Indians had we never learned.

'After resting up a few days at Martin's camp we proceeded to Fort Bowie and reported to General Crook, after nearly five months in the Sierra Madre, Sonora; the wildest and roughest mountain country I have ever seen, and our appearance was convincing evidence of the fact, for our clothing, from head to foot, was literally torn to pieces and we were a gaunt, unprepossessing

looking lot, tanned, bearded and long haired, with not very much to distinguish us from our Indian scouts!'

The army of the seventies and eighties was a small organization, scattered in many small posts, mostly in the South and West, engaged in frequently unpleasant duties, in controlling the Indians, who were untaught, savage, suspicious of the white man for very good reasons; an army living a narrow, isolated, intimate post life, enjoying simple pleasures, hospitable and generous, but underpaid, poorly appreciated, wretchedly housed; an army taught to obey, not given to unnecessary worry, happy-go-lucky, but admirable for its cheer, its gallantry and its ability to be happy under adverse conditions. It was an army whose senior officers were mostly veterans of the Civil War, men who had had larger commands and done larger things. Many of the company officers had been colonels or generals or were such by brevet. Possibly insistence upon rank was something of a compensation for lack of the more real evidences of importance. The officers still thought and talked much of the Civil War, still fought its battles on paper and in conversation, more or less convinced, perhaps, that military science had therein reached close to perfection.

Part and parcel of that army was the Medical Department. It shared the post life, the hunting, fishing, hops and rides, the hardships, the long marches, the poor quarters. Its members not only 'treated clap and confined laundresses,' but they marched against Indians, they treated all of the sick and all of the wounded, they reported upon the hygiene of posts, under the headings of food, shelter, clothing, ventilation and weather. Many medical officers were naturalists of one sort or another, botanists, ornithologists, mammalogists, ichthyologists, etc. Their contributions to knowledge of the flora and fauna of the United States were numerous and important. Others were classicists and found their recreation in Greek and Latin, still others musicians. Practically all were cultured gentlemen. Some medical officers who knew that generation and know the present, like many parents

and grandparents of to-day, think that the newer generation is less fine, less substantial, more superficial, although much better informed technically and professionally. But again it may be said that all that goes with the seed is unchanged. In the same environment the present generation of medical officers would differ little from that of the seventies. The old would be conservative, cautious and perhaps fossilized, the young heedless and radical in the same ways. History never repeats itself exactly, because the world moves. Each generation has to live its own life in its own times and its own environment, to start from its own location in time and space. We are what we are partly because our ancestors were what they were, partly because our times and environments are not what theirs were.

CHAPTER V

MEDICINE AND THE MEDICAL DEPARTMENT FROM 1873 TO THE SPANISH-AMERICAN WAR

IN 1875, the Surgeon General published Circular No. 8, 'A Report on the Hygiene of the United States Army.' This report was prepared by Assistant Surgeon John S. Billings, who later became the first Professor of Military Hygiene in the Army Medical School. He wrote:

'For convenience, I propose to comment on the subjects which are related to the health and comfort of the soldier in the following order:

- 'I. Habitations, including barracks, quarters and guard houses, with their appendages.
- 'II. The food of the Army, and its preparation.
- 'III. The clothing of the Army.
- 'IV. The hospitals and medical supplies.'

The presentation of the subject of military hygiene under the same headings to-day would, by comparison, make 'Hamlet' without the Prince of Denmark seem a well-completed work. It would be difficult to find much stronger support for the belief that modern hygiene was then unborn. This large, official work had nothing to say on water purification, on food-borne infections, on infections in general or the exciting causes of disease, on insects, on deficiency diseases, almost nothing on disease prevention or control. Under the heading 'Habitations,' Billings said:

'The barracks and quarters of the Army have, as a whole, improved within the last five years. The reduction of the Army, and the employment of a large part of it away from the permanent posts, has given a large air-space, with its accompanying advantages, to those quartered in regular barracks.

'It is only necessary, however, to refer to the air-space allowed at many of the posts, to prove that overcrowding still exists. . . .

'The want of bathrooms in these quarters [new plans] is especially to be condemned. . . . Next to fresh air and proper food, personal cleanliness is the most important agent in preserving the mind and body in proper working order, and it is not only a duty, but in the highest degree good policy and economy, on the part of the Government to provide the necessary facilities. A dirty man will, in most cases, be a discontented, disagreeable and dissolute man. . . .

'I would strongly urge that cheap, strong bathing-tubs, or other means for cleansing the whole body, should be as regular a part of the supply of a post as bedsteads. It is by no means sufficient that bathing facilities are good in summer. These should be attended to, for no bath tub can take the place of a plunge and swimming bath, and there are few places where the latter can not be arranged; but winter, as well as summer, should be provided for, and it is to be hoped that no plans for barracks or officers' quarters will be approved in future which do not contain provision for bathing in cold weather.' Brave words these, destined to bear fruit in another decade or two.

Ventilation is also discussed under 'Habitations,' there being two standards of sufficiency, carbon dioxide content of room air, and odor. The former is not so seriously regarded now as it was then. The matter of odor has become relatively unimportant also, since the growth of the habit of winter bathing. But at that time, 'It may be mentioned that at inspection on March 31 the odor in the company barracks was quite manifest, to one entering from the fresh air, fully half an hour after the rooms had been vacated by the men, doors opened, and the upper window sashes lowered, through which a light breeze was blowing at the time.'

Under 'Food of the Army,' Billings discussed the ration.

Post gardens or company funds were supposed to furnish fresh vegetables, none of which was a constant part of the ration, but in the seven years 1868-1874 there were 632 cases of scurvy reported.

Billings recommended the provision of ice at all posts.

At the end of the section on foods, he also recommended:

'1. That the present ration be increased.

'2. That the mess-furniture be considered as camp and garrison equipage, to be furnished by the Quartermaster's Department. Galvanized-iron vessels, with covers, for making soup and coffee, should be furnished in temporary camps or campaigns.

'3. That the company fund be used for the purchase of food only.

'4. That the chief cook of each company shall be a permanent detail, and shall receive extra-duty pay; that they shall be especially enlisted for that purpose, and that a school for the instruction of cooks be established at the recruiting-depots.

'5. That a manual of instructions for Army cooks be prepared and issued by the Subsistence Department, which shall give diet-tables and modes of preparing foods suited to the various stations, climates and seasons.

'6. That baking-powders and lime-juice be made a part of the ration for scouts and expeditions, and that canned tomatoes be issued at posts where fresh vegetables cannot be procured.'

Again a voice crying in the wilderness, prophesying things to come in the course of years.

Under the head of 'Clothing,' Billings notes that 'Great improvements have been made in the clothing of the Army, both as to pattern and material, within the last three years, and the articles now being manufactured are more satisfactory than any which have ever been issued to our troops.' He then discusses the various articles of issue, finding causes of complaint of all of them, but being pleased with new types of shirts, drawers and arctic overshoes about to be issued. Under 'Hospitals' he says:

'The hospitals of the Army are all post hospitals, are barrack or temporary structures intended to contain twelve or twenty-four beds. . . .

'There are about one hundred and forty post hospitals to be kept up, and the average cost of each is about \$7000. The average duration of one of these hospitals is intended to be about ten years, during which time it will cost \$3000 for repairs.'

This was then considered the best type of hospital for military use, the idea being that when thoroughly saturated with hospital poison, it would be rebuilt. Such hospitals were heated by stoves or fireplaces. They had no operating rooms or laboratories. Two special, fine, experimental hospitals were being built of brick or stone, one at the Soldiers' Home at Washington, the other at West Point.

Although Billings did not discuss meteorology, data in regard to it were furnished for each post described and the estimate placed upon it is shown by the following extract from an address by Surgeon J. J. Woodward upon the 'Medical Staff of the United States Army, and its Scientific Work': 'As intimately connected with the question of disease, the medical officer in charge of each post is required to keep a meteorological register, a transcript of which must be furnished to the Surgeon General at the end of the month.' This address of Woodward's was delivered before the International Medical Congress at Philadelphia in 1876. The meeting was a part of the Centennial celebration. It was participated in by the leaders of medical thought and practice of the entire country and by many distinguished foreigners, among others Joseph Lister, who presided over the Section on Surgery and talked upon antisepsis. The proceedings reflect the advanced medicine of that day, and several quotations will be made, for that reason. The discussion of antiseptic surgery was opened with a formal paper by Dr. John T. Hodgen, of St. Louis, who concluded: that putrefaction does not occur in the absence of living organisms: that germinal matter is found abundantly in air and water: that this matter resists exposure to a temperature of 300°, while monads die at 140°; that septicæmia is due to the pressure of the products of putrefaction in the blood; that absorption of putrefactive products from granulating surfaces does not occur with sufficient rapidity to cause septicæmia; hence septicæmia is more to be feared before than after the formation of granulations; that antiseptics act mechanically, to strain out germs as does cotton wool, or chemically to kill the germs or to destroy the

products of putrefaction; that it is not always possible to prevent access of germs to putrescible substances.

Lister himself discussed antiseptis, described in detail and demonstrated his technic, and emphasized his results. He said: 'I most heartily wish that I could dispense with the spray, yet I do not see how it can be accomplished. . . . The germ theory of infection is the foundation of the whole system of antiseptic surgery, and, if this theory be a fact, it is a fact of facts that the antiseptic system means the exclusion of all putrefactive organisms. . . . If it were true that water alone was the carrier of these germs, it would be of no use to employ the spray: it would only be necessary to cleanse the hands and instruments. Formerly, when I used the carbolyzed putty, I have seen a joint which had been laid open do admirably until blood clot at the wound was pulled away, when upon the next day the whole articulation would be in a state of putrefaction. I should like to know how this could occur save from air dust.'

Naturally, these two papers did not go unchallenged and there was vigorous discussion. Lister apparently had no supporters other than Hodgen, although nobody questioned the success of his results. Rather, they attempted to explain them in other ways than his.

A paper by W. T. Lusk showed that, despite the work and writings of Bright, Semmelweiss, and Holmes, it was not yet accepted that all puerperal fever was infectious. Lusk thought the non-infectious form due to 'traumatic inflammation of a simple character, to old peritoneal adhesions, to moral causes, and to vulnerability of the patient.'

Prevention is best accomplished in hospitals by the adoption of Lister's principles.

In the Section on Sanitary Science, Thomas E. Satterthwaite, of New York, read the leading paper. It was entitled 'The Present Condition of the Evidence concerning "Disease Germs,"' and the conclusions reached were:

'I. That, as far as inquiry has been made as to the nature of the

active principles in infective diseases, it is probable that in a certain number the matter is particulate, or molecular in form.

'II. That in regard to the causes of septicæmia, pyæmia, puerperal fever, erysipelas and hospital gangrene, and those of cholera, vaccine disease, the carbuncular diseases of man and animals, typhoid and relapsing fevers and diphtheria there is not satisfactory proof that they are necessarily connected with minute vegetable organisms.

'III. That the real cause of these diseases is unknown.'

The other papers presented to this Section of Sanitary Science were entitled 'Vital Statistics of Buenos Aires,' by S. Rawson, M.D.; 'The General Subject of Quarantine, with particular reference to Cholera and Yellow Fever,' by Surgeon General J. M. Woodworth, U.S. Marine Hospital Service; 'A Universal Pharmacopœia,' by E. R. Squibb, M.D.; and 'The Relations of the Pharmacist to the Medical Profession,' by Ezra M. Hunt, M.D. Plainly, the Section of Sanitary Science was not a very active section.

Major J. J. Woodward, in his 'Address on the Medical Staff of the United States Army, and its Scientific Work,' told of the reports of sick and wounded, the weather reports, the work of the Record and Pension Division, the growth of the Surgeon General's Library and the Museum, the 'Medical and Surgical History of the War,' the desirability of an Index Catalogue, Billings's 'Hygiene of the Army,' Baxter's medical reports of the Provost Marshal General's Office, Ely McClellan's report on the epidemic cholera of 1873, the chemical laboratory of the Surgeon General's Office, mainly devoted to examination of medical supplies, and his own photomicrographic work. All of this was good and important work, but it was being done mainly by three men, George W. Otis, Billings, and Woodward. Nearly all of it looked back to the Civil War; almost none of it bore directly on the prevention of disease or the improvement of health; practically none of it was being done outside the office of the Surgeon General.

Henry I. Bowditch, in his 'Address on Hygiene and Preventive

Medicine,' showed that only ten States of the Union were willing to spend money to support State or local boards of health, but sixteen to spend it to prevent adulteration of foods, but ten to spend for investigations tending to promote public health. But four of them had any county boards of health, none had had a sanitary survey of the State; but twenty had laws for the registration of births, marriages, and deaths; but fourteen had any laws relating to the introduction of water into cities; but four had laws relating to tenement houses; none had any evidence that any disease formerly prevalent had been crushed by State or individual action. Inquiries about waste disposal in cities and towns brought replies from eighty-four, of which only sixteen had proper and efficient means for removing such matters.

It is not unfair to say that hygiene, so lusty to-day, was yet unborn, or at any rate too feeble to cry sufficiently to attract attention. Unquestionably Medicine was in labor with the twins Bacteriology and Hygiene. The puerperal state was to be long and hectic, but mother and children were to survive.

Austin Flint's 'Address on Medicine' actually praised American medical education, which Dr. Norman Walker found so deplorable fifteen years later. Dr. N. S. Davis, in his 'Address on Medical Education,' also found himself able to praise it, although admitting that the schools 'have been rapidly shortening their annual courses; cutting off all collateral requirements; failing to grade the branches of medical study, as they have increased in number and extent, so as to adapt them to the several years of pupillage; and even reducing the final examination to the simple process of asking a few oral questions in the mysterious "green room."'

In 1877, Captain A. C. Girard, Assistant Surgeon, after a trip to Europe, came back thoroughly convinced of the value of Lister's antiseptic method, and from Fort Randall, Dakota Territory, he sent to the Surgeon General a full description of the technic and results. The introductory part of his report merits quotation as the earliest army advocacy of Lister's methods. It

will be found in Appendix 4. The remainder is descriptive of a technic now long obsolete.

But great days were dawning in medicine. Not only were Pasteur and Lister spreading their great discoveries, but men throughout the world were adding to the proof of their correctness, and Americans, such as Hodgen and Girard, were among the number. Obermeier had already demonstrated the cause of relapsing fever. In 1876, Robert Koch announced that he had worked out the life-history and sporulation of the anthrax bacillus. In November, 1877, he published his methods of fixing and drying bacterial films on cover slips and of staining them with anilin dyes. In 1878, he described the bacteria of six different kinds of surgical infection and showed that all bred true in the test-tube and in animals. In 1881, he demonstrated his method of obtaining pure cultures by the use of gelatin plates. In 1882, he identified the tubercle bacillus by his special culture media and staining methods, and in the same paper he formulated the famous 'Koch postulates' for establishing the special pathogenicity of an organism. In 1883, he discovered the cholera vibrio and established its relationship to the disease. In 1885, he was appointed Professor of Hygiene and Bacteriology at the University of Berlin, and as such was the foster-father of those healthy twins of science. Meanwhile Pasteur had discovered his bacillus of malignant œdema, von Bergmann had introduced corrosive sublimate antiseptis, Neisser had discovered the gonococcus, Eberth the typhoid bacillus, Laveran the plasmodium of malaria, Medin the epidemic nature of poliomyelitis, Loeffler the bacillus of glanders, Klebs the diphtheria bacillus. Patrick Manson showed (1879) that filariasis was mosquito-borne, and in 1889, Theobald Smith proved the tick-transmission of bovine piroplasmosis. Pasteur had successfully inoculated against anthrax, and Nicolair discovered the tetanus bacillus. In 1890, Behring found diphtheria antitoxin in the blood and Koch announced the discovery of tuberculin as a hoped-for cure for tuberculosis. And in America, Surgeon George M. Sternberg, after participation in

the Nez Percé campaign, had in November, 1878, been sent from his post at Walla Walla as Army representative at the meeting of the American Public Health Association in Richmond, and after his return had begun experiments on the value of disinfectants. In 1892, his 'Manual of Bacteriology' appeared.

As previously stated, General Barnes retired for age on June 30, 1882, being then sixty-five years old. He was succeeded in office by Charles H. Crane, who had been his office assistant since 1863. Surgeon General Crane had entered the army in 1847 and served through the Mexican War, after which he had a varied service in posts, Indian campaigns and with troops in the Civil War, until ordered to the Surgeon General's Office. His administration is not notable for any particular accomplishment, and the two years of it may be regarded as a continuation of Barnes's. He died in office in October, 1883.

Colonel Robert Murray was appointed Surgeon General the following month. Although he was then sixty-one years of age, his service had been mainly purveying and administration, and no record is found of any scientific work or writings by him, his reports afford evidence of scientific awakening in the Corps. His annual report of 1884 was the first to mention antiseptis. It also contained a rather lengthy discussion (for that day) of typhoid fever in the Army, bringing out evidence of its distribution from the recruiting depot at Jefferson Barracks. In his report for 1884, it is stated that there were 179 surgical operations performed in the preceding year, and that 'antiseptics during operations were used five times, and twice by spray. Simple evaporating lotions, or dry absorbent dressings were employed after operations in 65 cases, carbolized lotions, or oily mixtures of this agent, in 39 cases: the Lister dressing proper in 6: iodoform in 8, and corrosive sublimate in 7 cases. In 17 cases the antiseptic agent is not stated. Salicylic acid seems to have fallen into disfavor, having been used but once after operation.' Although this is the earliest report in which the use of antiseptics is discussed, the wording of the above

quotation permits a presumption that they had been used earlier. Sir St. Clair Thomson, who was at that time Lister's dresser, in 1928 told the writer that he considered any use at that time as highly progressive, because in 1883 Lister was still ridiculed and abused in London, his 'principles' were not accepted by his hospital colleagues, and Lister himself expressed the belief that they would not be accepted in his lifetime.¹ However, in the seventies and eighties most army surgeons were stationed in small posts, alone, with little incentive or opportunity to set rivers afire. Those who were more active intellectually were apt to spend their time on such hobbies as botany, ornithology, mammalogy, or other branches of natural history, or on music, literature and languages. In the eighties many of them were taking interest in antiseptics, bacteriology, and hygiene of modern type, but in the seventies only Sternberg was doing original work of the kind, so far as the examined records indicate.

General Murray's second annual report (1885) again discussed typhoid fever, and devoted a special section, one page in length, to the discussion of army and post sanitation, calling attention to overcrowding and to poor cookery, and said: 'The recognition of the fact that water may act as the carrier of disease germs calls for the utmost care in protecting sources of water supply for posts from all possibility of pollution: for caution in the use of streams flowing through settled localities, and in the exercise of judgment and intelligent knowledge in sinking wells in such positions that they may not be exposed to the drainage from inhabited neighborhoods, stables, or sinks.' He also recommended disposal of garbage by cremation, and stated that Lieutenant H. J. Reilly had devised a system which was then in successful operation at Governor's Island. An appendix to this report published five reports from four different medical officers, in regard to professional subjects. In 1885, the 'antiseptic method' had been used 42 times, in 170 operations. In this same year Sternberg was sent to Rome, as delegate to the International Sanitary Conference.

¹ See also *Lister: A House-Surgeon's Memories*. By Sir St. Clair Thomson. *Lancet*, April 9, 1927, p. 659.

Surgeon General Murray retired in August, 1886, and the annual report for the year ending June 20, 1886, was signed by J. H. Baxter, Acting Surgeon General. It states that the preceding year had been one of exceptional health and of the lowest death rate ever experienced by the Army. The deaths numbered but 7.1 per 1000, the discharges for disability 31.7, and the admission rate 1355. Typhoid fever fell to half of its incidence in the preceding year, but it appeared in 36 different stations. Malaria likewise fell, but it was still common. There was a serious outbreak of diphtheria at Fort Assiniboine, Montana, and the surgeon speculated as to its cause, advised the boiling of water, the wearing of overcoats, prohibition of the emptying of wash-water and slops about barracks, care in avoiding the use of damp or mouldy hay in bed sacks, and he expressed his surprise that the disease did not occur in the guard-house.

August showed the highest sick rate of any month of the year. This was probably true in civil life as well. At any rate, for years subsequent to this the late summer and early fall, now the doctor's holiday time, constituted the season of his hardest work; typhoid, diarrhoea, dysentery, 'summer complaint,' and malaria combining to make it such.

There were eighty-four commands in the field during the year, embracing 8424 officers and men. Their health was better than that of men in garrison, but seven men, including one medical officer, Assistant Surgeon Maddox, were killed and eight wounded in battles with Indians. Antiseptics were employed in sixty surgical operations, not employed in one hundred and eight, and no information on this point was given as to sixteen.

Cocaine was satisfactorily used in two operations on the eye. There are fifteen detailed reports of cases of aneurysm, in only one of which was syphilis mentioned, it being stated in that case that the man had had no previous illness except gonorrhoea and syphilis. Evidently aneurysm was not thought syphilitic.

In this same year Acting Assistant Surgeon Leonard Wood was acting as surgeon to Captain Henry W. Lawton's expedition

against the Apaches under Geronimo. He was acting as a company officer as well as surgeon; in one period of thirty-six hours he rode seventy miles and walked fifty-five, carrying dispatches. Almost twenty years later, after he had distinguished himself in other ways and was a general officer, he was rewarded for this work by the Congressional Medal of Honor.

As in each of General Crane's and General Murray's reports, the establishment of a hospital corps was again urged and the need for more medical officers presented. An outbreak of typhoid fever at Fort Douglas, Utah, brought forth descriptions of local sanitary conditions which would be nauseating if encountered now.

On November 18, 1886, Lieutenant Colonel John Moore was appointed Surgeon General to succeed General Murray. There were battles in those days; partisanship was rife in the Corps and out, and all senior members were candidates for the surgeon generalcy. After the battle had waged for three months and a half, the President settled it by the appointment of Lieutenant Colonel Moore. He was then sixty years of age and had been in the service thirty-three years, had received two brevets for distinguished service in the Civil War, and had had a varied service thereafter. His appointment was well received. He took into his office as assistants three strong and remarkable men, Colonel Baxter and Majors Greenleaf and Smart, who worked with him for the upbuilding of the medical service. Surgeon General Moore's first report (1887) says that the law to organize the Hospital Corps having been signed by the President, transfers of men were being made from the line of the Army as rapidly as possible. He recommended an increase of twenty cents per day in the pay of the Hospital Corps.

He also quoted the revision, dated July 15, 1885, of Paragraph 2315 of Army Regulations, directing medical officers to make monthly sanitary reports covering certain subjects and making it mandatory that commanding officers forward those reports, and he stated that the good effect of the regulation was clearly

shown by the character of the reports received in 1886. The sick rates were again low, despite the continued lack of bathing facilities and sewerage and the continued use of insanitary privies and earth closets. At post after post it was shown that some quarters, usually those of married soldiers, were unfit for habitation and should be destroyed and replaced. Surgeons from the Southwest got in recommendations for issues of lighter clothing for summer in very hot climates. This carried the approval of commanders. The death rate for the year was 8.8 per 1000 of mean strength, the sick rate 1037, the discharges for disability 24.9, the admissions for alcoholism 47 per 1000. Vaccination was this year done principally with bovine virus, although the old arm to arm method was used in nearly half of the cases. The 'Hygiene of the Army' received fifteen pages of discussion, none of it dealing with 'germs.'

The Army and Navy General Hospital at Hot Springs was opened on January 17, 1887, with sixteen beds for officers and sixty-four for enlisted men. Forty-five patients were admitted during the first half year.

The annual report of 1888 showed further advances in civilization. The Surgeon at Fort Sill wrote: 'Three years ago [when he joined the station] the men had only rough pillows and bed sacks, filled with the coarsest kind of hay, for bedding. Now they have good wire spring mattresses and hair pillows, sheets and pillow slips, all of which they highly appreciate. Then the squad room walls and bedding were infested with vermin to a most annoying degree: now there are no complaints and no occasion for any. Then the only bathing facilities during cold weather consisted of a wash-tub taken into the mess room: now there are very good bath and lavatory accommodations, properly heated in the winter, so that the men can bathe at any time, which they do frequently. Then the water supply was scanty and of the most doubtful character: now it is abundant and of the best quality.'¹

The report for 1888 stated that 'The organization of the

¹ *Surgeon General's Report*, 1888, p. 136.

Hospital Corps is now nearly completed: 614 privates have been transferred to it from the line, 24 of whom were found qualified, after examination, for the position of acting hospital steward, and so detailed: 125 vacancies still remain: 9 for civilians, 10 for privates, 81 for acting hospital stewards and 25 for hospital stewards.'

This was an event truly great in the history of the Medical Department, but its greatness is not apt to be appreciated by the present generation of medical officers, whose whole service has been familiar with the work of the highly trained female (I beg their pardon for the use of the word) Nurse Corps which has been part of the Army since the Spanish-American War. Even to-day the smaller posts do not have these and the nursing and all other hospital work is done by men only. But prior to that war and after 1888 there was only the Hospital Corps. It speedily developed a splendid corps spirit, took great interest in its work, was given training in nursing and field work by the medical officers, developed many excellent technical assistants for operating room and laboratory, and enabled the medical officers to organize and conduct their hospitals in the (then) most modern manner. The Hospital Corps contained many men of splendid types, and medical officers were as proud to have their friendship as they were pleased to have their assistance. In the hospital and in the field they rang true.

If occasionally the line passed off a drunkard on us, as it did, the poor fellow was very apt to have other qualities which largely compensated for the defect, and in most instances he could be counted upon for sobriety in times of stress and trouble.

The report of 1889 showed that the army of 25,000 officers and men was distributed in 134 military posts. The largest garrison had 700 men; 58 posts had an average of 60 men each and 35 had from 100 to 200 men each. Typhoid was relatively low that year, but it was still being widely distributed from the recruit depot at Jefferson Barracks. It is interesting to speculate at this time whether or not the wide distribution of typhoid in the Army of the

eighties and nineties and much of its prevalence in the Spanish-American War were not primarily due to the presence at Jefferson Barracks in the eighties of a cook who was a typhoid carrier.

The sanitary condition of the Army this year received about forty pages of discussion, which showed that the physical condition of the posts was still bad in very many instances.

General Moore retired for age in 1890, after a very creditable administration, and was succeeded by Colonel Jedediah H. Baxter.

General Baxter was one of the numerous, strong, perennial candidates for the surgeon generalcy, a good fighter, good hater, as good a friend, and an able man. He entered the service through the volunteers in 1861, was next year made Chief Medical Officer of the Provost Marshal General's Bureau, and upon completion of the work of that Bureau, was made medical purveyor with the rank of lieutenant colonel. In 1874, he became chief medical purveyor with the rank of colonel. He was the only officer in the Corps who had not entered it as a lieutenant, which fact did not make for corps popularity. He prepared a report of 'Medical Statistics of the Provost Marshal General's Bureau,' which was published in two large quarto volumes in 1875 and was considered, and is still, a mine of valuable statistical information. Able and ambitious, he tried for the appointment to succeed General Barnes. When General Crane died, his name forged well to the front, when General Murray retired, he was one of the most conspicuous candidates for the succession. At the time of General Moore's retirement, Baxter was the senior colonel, his personal friend, Hon. Redfield Proctor, was Secretary of War, and President Harrison was a comrade and a long-time patient. Baxter was appointed, and served less than four months, dying suddenly. There was again a lively scramble for the succession, but President Harrison again selected the senior colonel, Charles Sutherland.

General Sutherland had entered the army in 1852, had service in New Mexico and Texas, with much Indian fighting, until the

outbreak of the Civil War. Escaping capture in Texas, he had served with distinction in the Army of the Tennessee, the Department of Virginia and North Carolina, and the Army of the Potomac. After the war he was made medical purveyor with the rank of lieutenant colonel. His administration was described (Pilcher) as 'conservative and progressive,' which probably meant that medicine and the Medical Corps were progressing and that the Army was conservative. This is indicated in General Sutherland's annual reports. Certainly the Medical Corps was progressing. There was growing interest in sanitation, the practice of antiseptis was so common that it neither required nor received special mention, officers were submitting numerous reports upon professional subjects. The rate of discharges for disability fell to 23.01 per 1000 in 1891, to 17.23 in 1892, and was 18.35 in 1893. The death rate in 1893 was 6.44 per 1000. In this year there were 151 cases of typhoid fever in 47 posts. Both Sternberg and Gorgas reported upon post epidemics and attributed them to water supplies.

Congressional and War Department conservatism are suggested by the following extract from General Sutherland's report (1891): 'Overcrowding and its associated defective ventilation are the sanitary faults that are most frequently noted: but bad construction, inefficient means of heating, undrained and unventilated sites, with rotting woodwork, leaky roofs and general dilapidation are occasionally recorded.' This report tells of the last Indian war and the first experience of the Hospital Corps in battle. A command of 77 officers and 1300 enlisted men was concentrated at Pine Ridge Agency, South Dakota. 'The medical organization consisted of a division field hospital, two medical officers, two non-commissioned officers, and ten privates of the Hospital Corps. The tentage had been increased with a final capacity for sixty patients, and the equipment was considered fairly complete.

'With the two battalions of the Seventh Cavalry were two medical officers, one hospital steward, and four privates of the

Hospital Corps, two ambulances: Light Battery F was attached for medical service. With battalion of the Ninth Cavalry, one medical officer, one acting steward, and five privates, one ambulance; the Indian scouts were attached for medical service.'

On December 29, 1890, the battle of Wounded Knee was fought. One officer and twenty-nine men were killed, and two officers and twenty-nine men wounded. The latter and twenty-eight wounded Indians were taken to the hospital. A skirmish that night and another next day added one officer and seven enlisted men to the number of wounded. Captain John Van R. Hoff, Assistant Surgeon, reported: 'I have heretofore had the honor to submit many reports and suggestions regarding the Hospital Corps under various conditions of service, in post, camp and field, but it was only recently I had an opportunity to see its working under the crucial test of battle. It is but faint praise to say that it more than met my expectations.' He describes very gallant conduct by his three men, one of whom, Steward Pollak, was killed.

The post canteen had supplanted the post trader and it was allowed to sell beer. It was generally popular and it received the approval of all medical officers except Captain R. P. Ball, who uttered a discordant note when he wrote from Fort Riley: 'The post surgeon is skeptical as to the sanitary value of the canteen. He has treated more cases of alcoholism and has sewed up more cut heads in a given time since its establishment than previous, and this does not argue in its favor. He is unable to see how giving the soldier double the quantity of beer for the same money can conduce to his sobriety and efficiency.' A kill-joy sort of a man, this Captain Ball, and he was doubtless properly rebuked by the Surgeon General's comment: 'Captain Ball's remarks would have more value as against the canteen if Fort Riley was a post with a reputation for alcoholism: . . . Only 13 posts had a better record in this respect, and 108 had a worse.'

General Sutherland's report for 1892 called attention to the Medical Department's new supply table shortly to be published.

Particular attention had been given to a new field equipment and the belief was expressed 'that this equipment marks decided progress, and that in this respect our Medical Department is now equal to, if not in advance of, the medical service of any other army.'

Comment was made upon certain radical defects in the medical departments of the National Guard, namely, the absence of organized medical departments in the States, the lack of a hospital corps, and the appointment of medical officers without examination to determine their fitness.

The medical officers of the Guard were also awakening. Under the able leadership of Nicholas Senn, they this year (1892) organized the Association of Military Surgeons, for the purpose of correcting these and other defects. The Association did not end with the correction of the defects, and it is alive to-day, fairly vigorous, quite useful, and maintaining a very good monthly journal, 'The Military Surgeon.'

Typhoid occurred in thirty-six posts and the remarks about it were 'progressive and conservative.' Progressive was the following suggestion of contact infection: 'Two of these were undoubted importations from Fort Douglas, Utah: one was in the person of a hospital corps private on duty in the ward with these men, the fourth occurred by contact with the first during convalescence, and the last in a boy who carried the soiled linen to the laundress.' More conservative was this: 'There seems to be no doubt that where improvements have lowered the ground water level to a certain extent the malarial fevers are replaced by typhoid with or without an intermediary typhomalarial stage.'

The idea that medical officers had other duties than the treatment of sick men was beginning to penetrate the more acute intelligences of the line of the Army, as shown by the following statement by General Wesley Merritt.¹

'To the Medical Department belong the duties of taking care

¹ *The Armies of Today*. Harper and Brothers, publishers, New York, 1893, p. 14.

of the sick and wounded of the army, and the prevention, as far as human science can go, of the first and greatest source of an army's depletion in the field — sickness in camp. These duties involve part of those of the Quartermaster-general's Department, and part of those of the Subsistence Department, while they have much that is common to neither to attend to. In other words, an efficient medical officer must be a good quartermaster and a good commissary, and, above all, a skilled surgeon and physician.'

General Sutherland was retired for age in May, 1893. The usual scramble for the place succeeded, all senior officers being candidates, but President Cleveland appointed Lieutenant Colonel George M. Sternberg, the most eminent man, professionally, in the Corps.

In connection with this appointment the following story by Lieutenant Colonel W. C. Borden, retired, for many years now Professor of Surgery and Dean of the Medical Department of George Washington University, is of interest. Before his entry into the Service, Borden was interested in histology, and when sent to a Texas post he made special requisitions for and obtained a fine microscope, a photomicrographic apparatus and other things not on the supply table. Colonel Baxter, then Chief Medical Purveyor, disapproved of these requirements, but had to purchase them. As soon as he became Surgeon General he procured the issue of an order changing the stations of thirty-two medical officers who had incurred his dislike, among them Borden. Shortly after this, Dr. Borden was in Washington and he called at the Surgeon General's Office, but General Baxter was away. Major Greenleaf, a delightful, kind, and very able man, but an administrator and not a microscopist, undertook to set the young man on the right path, telling him to quit 'fooling with the microscope' and to do things for the Corps. Borden replied that he did all of his duties and still had much spare time, and that he could not see why exception should be taken to his choice of microscopy in place of cards, drinking, hunting, or the club. Greenleaf said that there was no objection, but that it got one

nowhere. 'Look at Sternberg, over there in New York, spending all his time with a microscope. Can you tell me one earthly bit of good Sternberg is to the Medical Corps?' Sternberg's later appointment to the surgeon generalcy over himself was probably never understood by Greenleaf and many others.

President Cleveland's appointment of George M. Sternberg to be Surgeon General was symptomatic of the times. The world was changing, and few things in it were changing more rapidly than medicine. Bacteriology and hygiene were existing facts, which promised immense good to mankind. The old, dogmatic systems, the scholastic era, of medicine were passing. It was becoming recognized that disease was not a punishment sent for violation of the precepts of religions, but that it was the result of definite, physical, earthly causes, and the hope was growing that the laws governing its causes, progress, prevention and cure could be worked out as could the laws of physics and chemistry and that, once known, they could be utilized for man's advantage. The new ideas were as new to most medical men as to well-informed laymen, and they were as readily grasped by the latter as by the former. This gave rise to a great popular interest in medicine, and in its newest branch, bacteriology. Sternberg stood as the greatest and the most productive man in bacteriology in America. He was representative of the new thought and progress in medicine. His selection to be Surgeon General was natural, symbolic, almost inevitable. It is probably true that Greenleaf would have been a greater administrator, but the Medical Department was not then looked upon as one calling for great administration. It was concerned with medicine, it needed to be led into the ways of medical advancement, and Sternberg was in the position to so lead it. That there were other factors concerned in his appointment is doubtless true, but his position in the medical world was enough to justify the selection. His appointment is frequently referred to as responsible for the awakening of the Medical Department, but that is not strictly true. It is only necessary to read the successive reports of the Surgeon Generals

in the seventies and eighties to see that the Department was awakening and moving forward about as rapidly as the rest of the medical world. Nevertheless, with Sternberg at its head, writing voluminously on and known as an industrious worker in bacteriology, its advancement was more rapid than it would have been otherwise.

One of his first official acts was to get authority for the establishment of an Army Medical School, an authority granted by G.O. 51, A.G.O., June 24, 1893. As he said in his annual report for 1894, he 'recognized the possibility of improvising a school which, although adding nothing to the expenses of the Army Medical Department, would afford all the advantages that could be derived from one costing heavily for its establishment and maintenance. The building provided by Congress for the Library & Museum gave the necessary lecture rooms, and the accumulation of material for bacteriological and chemical study in the Army Medical Museum furnished everything essential for laboratory work, so that by utilizing these, together with the ability and experience of those medical officers already on duty in this city who have been appointed members of the faculty, I was enabled, with the approval of the Secretary of War, to inaugurate this important work. The transfer of the Hospital Corps company from Fort D. A. Russell, Wyoming, to Washington Barracks completed the equipment of the school by providing facilities for instruction in drill, company administration, first aid, and battle-field management.'

The first faculty of the school was as follows:

Colonel Charles H. Alden, President of Faculty and Lecturer on Duties of Medical Officers.

Lieutenant Colonel William H. Forwood, Professor of Military Surgery.

Major John S. Billings, Professor of Military Hygiene.

Captain Walter Reed, Professor of Clinical and Sanitary Microscopy, and Director of the Pathological Laboratory.

Captain Julian M. Cabell, Instructor in Hospital Corps drill.

In addition there were given the following lectures by men not on the faculty:

On bacteriology, nine lectures, by Surgeon General Sternberg.

On military law, five lectures, by Major G. B. Davis, Judge Advocate.

On comparative anatomy, three lectures, by Captain J. C. Merrill, M.D., U.S.A.

On medical jurisprudence, four lectures, by Dr. Robert Fletcher.

On parasites in man, two lectures, by Dr. C. W. Stiles.

On head surgery, one lecture, by Dr. W. W. Keen.

From this school have come many good things. It has grown with the years, is now worthily housed in its own special building at the Army Medical Center, and it has ever been a center of scientific interest, work, research and instruction. Except for interruption of its work by the Spanish-American War and the first years of the Philippine insurrection, it has trained all officers entering the Army from the time of its inception to the beginning of the World War, and it is now instructing large numbers of medical, dental, and veterinary officers. It is Sternberg's greatest monument.

The facts of Sternberg's appointment and the establishment of the Army Medical School were not indicative, however, of any vast love and appreciation of either on the part of Congress, which that year passed a law reducing the number of assistant surgeons from 125 to 110 and prohibiting the employment of contract surgeons.¹ It is probable that only the fact that the numbers of

¹ The number of officers in the Medical Corps was at no time between the Civil and the Spanish-American Wars nearly large enough to meet the demands. Acting assistant surgeons, medical men serving under contract, had to be employed in large numbers, at times considerably in excess of the number of regular medical officers. These men, it is but just to say, had on the average harder service than the commissioned medical officers, as the same class later had in the Philippines. They were usually stationed in small posts and were very apt to draw field service.

Their official status was poor and unsatisfactory. The mule, without pride of ancestry or hope of posterity, neither horse nor ass, unloved and unlovely, the recipient of contumelious language, was the Army's standby and salvation in the field in time of trouble. The contract surgeons' status was somewhat

the faculty did their school work in addition to their other duties saved the Army Medical School from early extinction.

The health of the Army in 1893 'differed but little from that shown by the best of the Army medical records. The admission rate per thousand of strength present was 1289.04. . . . The rate of discharge for disability reached its lowest point this year, only 14.93 per thousand of strength, as contrasted with 18.35 during the preceding year and with 28.92 during the years of the previous decade. The lowest rate prior to that of the present year was 17.23 in 1891. This satisfactory result is certainly due to the greater care taken in the selection of men for enlistment. . . . The deaths from all causes equaled a rate of 6.91 per thousand living, the lowest rate heretofore recorded having been 6.33 in 1889.' There were 159 cases of typhoid fever, mainly in Jefferson Barracks and posts supplied with recruits therefrom. An epidemic in Fort Leavenworth military prison caused much speculation by the Surgeon General, who ruled out as probable causes the water supply, importation of cases, contact infection, uncooked foods, and defective sewers. For lack of other evidence he thought the ice supply probably contaminated, but at this late date it is interesting to note that the possibility of infection by a carrier or by a sick or convalescent man in the kitchen did not occur to so eminent an epidemiologist. The same thing was true five years later, during the Spanish-American War. In that respect Sternberg was not ahead of his contemporaries.

An epidemic of dengue at Forts Ringgold and Brown, attacking 154 of the 178 men constituting the latter garrison, was ascribed to contagion brought in by a child and an Indian scout. Twenty cases of diphtheria occurred. Antitoxin was not in use.¹ Malaria

similar. Neither commissioned nor enlisted, without regiment or corps, having no hope of promotion and dubious rank, they survived because they were needed, were respected for their personalities, were as necessary as the mules, harder worked, and quite as much an ever present help in trouble. They have never been accorded their just dues. Many were splendid men.

¹ In the preceding year eight cases of diphtheria, five of them fatal, had occurred in one family at West Point. 'The house occupied by Mr. Bailey was destroyed by fire together with two tents and some articles of equipage . . . that had been used in connection with the treatment of the cases.'

was about fifty per cent more prevalent than in the preceding year, the admission rate 93.64 per thousand. Diarrhoea and dysentery combined to give an admission rate of 98.47.

The venereal rate was 73.08, highest among Indians, lowest among negroes, 'the latter being a fact seldom, if ever, noted before this year.' Columbus Barracks had a venereal rate of 333.88 per thousand. The admissions for alcoholism were 33.97 per thousand.

The quarters, water supplies, drainage, and waste disposal systems of the posts showed slow improvement.

General Sternberg's annual report of 1895 calls attention to a new edition of the supply table and to the adoption of the metric system of weights and measurements for drugs. Post surgeons had been directed during the year to set aside one room in their hospitals as an operating room. 'Especial attention is to be given to the cleanliness of this room, including its walls and floors, as well as the necessary furniture: and in it are to be kept all the instruments and dressings, antiseptics, anæsthetics, and appliances that may be needed in an emergency — for most of the surgical cases treated in a military hospital are of this character.' A new litter, weighing but seventeen pounds, instead of twenty-four, was adopted for field use. It is noted that Captain Charles F. Mason, M.C., used diphtheria antitoxin in eleven of twelve cases of diphtheria at West Point, with happy results in all.

'Recently published medical works were sent to military posts with the view to keeping medical officers informed of current advances in medicine and surgery.'

In July, 1894, a force of ten troops of cavalry, four batteries of artillery, and twenty-three companies of infantry was stationed in Chicago to protect Government property and restore mail service, which had been interrupted by rioters. The Medical Department had with these troops eleven medical officers, four hospital stewards, four acting hospital stewards, and twenty-five privates. A tent hospital of thirty beds was established at the camp on the Lake Front. The wards were floored and furnished

with field cots, blankets, and 'mosquito bars to keep off the flies which swarmed on the camp ground. . . . Acute diarrhœa was unusually prevalent, . . . due in all probability to exposure to heat, change of diet, and the excessive use of hydrant water.'

Another concentration was made at about the same time and for similar reasons at Sacramento. 'The health of the command was excellent during July. . . . The diseases were mostly cases of heat exhaustion and diarrhœa. The diarrhœa was attributed to the excessive use of iced water, to which they were not accustomed. It was accompanied with colic and some prostration. In August, malarial fevers of a quotidian type became common. Quinin, twenty grains daily, usually controlled them within twenty-four hours. The troops became so thoroughly infected that within three weeks after their return to the Presidio on September 3, eighty-five cases of fever were admitted to the sick report. The malarious exhalations came from a swamp near the shop yard.'

Ten cases of typhlitis, abdominal abscess, or appendicitis were operated upon in 1894, four of them resulting fatally. Two cases of tetanus were reported; one of them was given antitoxin when convalescent, on the seventh day of the disease, and recovered. Officers were performing all sorts of emergency operations with a degree of success probably comparable with that in the best civilian hospitals of the day.

The sanitary reports revealed dilapidation of barracks and quarters at certain posts, especially in the West, but faulty drainage is mentioned at only a few posts. However, privies and sinks were still the rule, water-flushed toilets the exception. The question of sewerage was still being debated, and water supplies were in seventeen instances reported insufficient or of poor quality.

Under 'Habits, Cleanliness, Athletic Exercises,' etc., it is stated that 'The post exchange is not suggested as a causative agent in the brawls and breaches of discipline occasionally reported as the result of alcoholic excesses. Usually these are attributed to the

facility with which whiskey can be procured in the neighboring civil settlements. [Captain Ball's opinion, if expressed, was not quoted.] The facilities for bathing have been improved greatly of late years, so that current sanitary reports have no reference to the absence of means for this purpose except at the recently reestablished post of Key West Barracks, where there is only salt water bathing.' The building of gymnasiums was being urged by medical officers of certain posts.

But one officer reported anything in regard to the National Guard. Major B. F. Pope, in reporting his service with troops at Sacramento, said: 'Their medical officers frequently visited our field hospital and expressed great admiration at our medical, surgical, and personal equipment. The equipment of the medical department of the guard was as good as the voluntary contributions of the medical staff and its friends could expect. They were alive to its deficiencies, due to want of money appropriations by the State, and compensated as well as they could for this lack. They had no litters or ambulance equipment.' A new, international system of statistical reports, practically that now in use, was this year adopted (1895).

The annual report for 1896 shows that Major Charles Smart's course in hygiene at the Army Medical School did not yet touch upon bacteria as a cause of disease, but that Walter Reed's course in the pathological laboratory included lectures 'on the history of bacteriology, the classification of bacteria, the normal bacterial flora of skin and mucous membranes, the bacteria of surgical infection, of croupous pneumonia and diphtheria, and on the histology and pathology of the blood.' The admission rate for disease and injury was 1110.02, the death rate 5.16, the discharges for disability 9.15 per thousand.

There were but 109 cases of typhoid fever, thirteen of them fatal. 'Cases of this fever with obscure causation so frequently occur in our Army that many medical officers have ceased to look for a previous case, and endeavor instead to determine the insani-
tary conditions present in the case under consideration but not

present in other and unaffected parts of the command.' Many believed, with Captain George Bushnell, who submitted a long report and argument on the subject, in 'the theory of a *de novo* evolution of the typhoid germ from saprophytes in the soil as the only method of accounting for the occurrence of cases during field service.' It is evident that doctors were so wholly committed to the view that typhoid was always a water-borne disease that, when the facts did not seem to conform, hypotheses were formulated to bring them into conformity. A somewhat similar psychology was displayed in France during the World War, when some American medical officers were so convinced that the typhoid vaccination would always prevent typhoid fever that they failed to recognize typical cases with hemorrhage, and even attempted to explain away the characteristic post-mortem findings.

Malaria was also a puzzle. Major Charles Smart, after an investigation at West Point, concluded that 'the malarial cause is not only exhaled from the soil and propagated from the air, but that it is washed from the luxurious soil by surface waters on their way to the streams and ponds, and may be propagated by the drinking water.' Walter Reed, after an investigation of the disease at Washington Barracks and Fort Myer, thought the disease due to emanations from the Potomac flats, rather than from drinking-water, because the installation of a new and improved water supply at Fort Myer had been followed by an increase of malaria, instead of a decrease. These were wise men and good, but they yet lacked the key which Reed was later to use so effectively in unlocking the secrets of yellow fever. The mosquito, like the fly, was still merely a nuisance.

There was yet much discussion and speculation as to the nature of 'mountain fever' and 'Texas fever,' with opinion inclining more to their typhoidal nature. Spotted fever of the Rocky Mountains was reported and discussed in this report.

The 1897 report shows that 542 operations were performed by Army surgeons in the preceding year, among them a prostatec-

tomy. The discussion of the hygiene of the army indicates great interest in water supplies. The supplies of many posts were criticized and the suggestion was made that a portable filter was desirable for use in the field. An emergency ration of bacon, hard bread, coffee, saccharine and pea-meal was adopted and tested. Its continued use for a longer period than ten days was forbidden.

The next annual report dealt with the fiscal year 1898, which covered the earlier part of the Spanish-American War. The rate of admissions to sick report was 1186.61, of discharges 9.61, and of deaths 5.11 per thousand. Typhoid appeared in forty-seven stations and there were 159 cases. The Widal test was taught in the Army Medical School and was used in diagnosis. Diarrhœa caused 73.77 admissions, venereal disease 84.59, and alcoholism 27.86 per thousand.

Among the immediately useful medical advances of this period, the nineties, the most important were the discoveries of diphtheria antitoxin and of the Roentgen ray. Of quite as great importance, so far as the Army was concerned, was the increased interest of non-medical men and Army officers in the advances of medicine, a growing, though still rather feeble, belief that military medicine had a part of real importance to play in military affairs, that it had something to offer and a place to fill. The recognition of that fact was of slow growth, as, indeed, was the fact itself, but it had begun to bud.

A few medical officers had long seen the need for an improved military status for themselves and their fellows, and by their insistence upon military forms, titles, salutes, drills, and other outward symbols they incurred no little ridicule. Colonel A. A. Woodhull and Major John Van Rensselaer Hoff were the outstanding examples of this attitude. They were known for it and were very generally ridiculed by those who did not know them. To those who did know them, whether in the field or in garrison, their abilities, courtesy, learning, high character, efficiency, and dignity were such as to stifle ridicule. Without shadow of turning they held their way. Like all reformers, they may have gone

farther at times than was necessary, farther than lesser men could have gone, but they were men who could do it and keep respect. Gradually the result was attained, and for us who enjoy it, it is difficult to appreciate the efforts of these men. But Woodhull and Hoff could never have seen their aims attained had medicine rested where it was in the seventies. As it grew and had more to offer, the medical officer grew in esteem and favor. If gratitude be a lively sense of benefits to come, that of the Army to the medical officer is but one of many examples.

The Army entered the war with Spain without sufficient or modern equipment, without training or experience in larger bodies than regiments the size of present war-time battalions, without a general staff, without staff departments with experience in handling or supplying large bodies of troops, without reserves of men or material, without general hospitals, without knowledge that malaria and yellow fever were transmitted by mosquitoes, practically without knowledge that typhoid fever could be conveyed in other ways than by water, with that little knowledge which is so dangerous a thing.

PART THREE
THE SPANISH-AMERICAN WAR

Find out the cause of this effect,
Or rather say, the cause of this defect,
For this effect defective comes by cause.

Hamlet, Act II, Scene 2

PART THREE
THE SPANISH-AMERICAN WAR
CHAPTER VI
THE CAMPS AND TYPHOID

THE Spanish-American War is not the subject in the review of which the Army and the Medical Department take most pride; yet it is very important in their history, and in general it must be regarded as creditable to them. As in the instances of the Mexican and the Civil Wars, the lack of preparation may be rated as close to one hundred per cent. The results of such lack were very costly, but they did teach lessons which have not entirely failed; they started the Army and the Medical Department in ways of study and hard work which still obtain and which have resulted in their great improvement. The war also resulted in a quickening of the public consciousness of military and of world affairs and an increased interest in them.

For three years prior to 1898 there had been a more acute exacerbation of the chronic discontent of Cuba with Spanish rule, and armed rebellion became extensive. The Spanish efforts to quell this necessitated large bodies of troops in Cuba and the institution of measures of severity such as are apt to characterize wars. The nearness of Cuba to our shores, our traditional sympathy for oppressed peoples and for all engaged in efforts to throw off the yoke of tyrannical, foreign (and especially monarchic) control, made the struggle one of profound interest to Americans. The newspapers did not neglect a matter of such news interest. Both political parties expressed sympathy for the Cubans in their national platforms of 1896. 'Towards the close of Mr. Cleveland's administration sympathy with the insurgent Cubans had become the popular test of human kindness, and protest against war the unanswerable proof of unchristian indifference.' Such was the general attitude of our people when Mr. McKinley took

office. Earnestly desiring to avoid war, he appointed a new minister to Spain and tried by negotiations to effect a settlement, or at least an improvement of conditions in Cuba. The negotiations dragged and no improvement was effected. Spain had in military command in Cuba, Captain-General Weyler, 'Butcher' Weyler, as he was called in the United States. In his efforts to control the insurgents, he resorted to a policy which has been used by others before and since, that of concentration of the inhabitants of certain districts into camps, where they could not aid the insurgents or hinder the progress of campaigns. Tales of terrible cruelties flooded America, our people were highly indignant, and the administration demanded that Spain recall Weyler and revoke his *reconcentrado* edict. Spain did both, and sent Captain-General Blanco to Havana to reorganize the government upon a basis of autonomy. Whether or not Blanco could have made a satisfactory settlement of affairs is unknown. Before he had an opportunity to do so, the battleship Maine, visiting in Havana Harbor, was destroyed by an explosion, with a loss of 266 American lives. A Naval Board reported that the Maine had been destroyed by an explosion from the outside, and America was afire from that moment.

On March 9th, Congress appropriated 'for National defense' the sum of \$50,000,000 and placed it at the President's disposal. From this sum, used mainly for coast defense purposes, the Medical Department was allotted \$20,000, the Medical Department, which was to have the hardest task of the war, which had no reserve supplies because their accumulation was forbidden by law!¹

¹ It may be stated here that the great amount of sickness in the Army during the war, the many failures and more numerous alleged failures of supply and care of the men, resulted in the appointment by the President, after the return of troops from Cuba, of a commission to investigate the conduct of the War Department. The President personally instructed the commission to make the fullest examination of the administration of the War Department in all of its branches. The commission elected General Grenville M. Dodge its president and was therefore generally known as the Dodge Commission. It met on 109 days and submitted a voluminous report. The report was temperate and just and was accepted as accurate. From it many quotations will be taken.

The strength of the Army on April 1st was 2143 officers and 26,040 enlisted men. Congress authorized an increase of the Regular Army and the creation of a Volunteer Army and the strength of these reached its maximum in August, as follows:

	MAY	JUNE	JULY	AUGUST
Officers —				
Regular	2191	2198	2327	2232
Volunteers	6224	7169	8633	8785
Enlisted men —				
Regular	41934	49513	53931	56365
Volunteers	118580	153355	203461	207244

It will be noted that the number of regular officers was scarcely increased at all, although the enlisted force was more than doubled. On the other hand, 387 regular officers were commissioned in the volunteer forces with higher rank. It was decided that the National Guard should have preference as volunteers, the whole number of applicants greatly exceeding the call. The Guard was to be mustered into Federal service with its officers and vacancies in the line were to be filled by the governors of States. The Guard was thus favored for three reasons, as a reward for long interest in the service, because it was supposed to possess a fair amount of equipment, which the National Government was not prepared to supply, and because it was supposed to have had valuable military experience. These suppositions were doubtless partly justified by facts in some instances, but by no means in all. 'The arrival of the volunteers from their several States at the camps of instruction quickly demonstrated the fact that, so far as equipment was concerned, these militiamen were little better than recruits. Not a single regiment was ready for the field. They were deficient in regimental equipment of every kind. No less than 100,000 Springfield rifles and carbines were issued to volunteers who had been supposed to be well armed. Very many arrived in camp without uniforms, accouterments, rifles, or anything, in fact, necessary for active service, except that enthusiasm

which is the invariable characteristic of the American volunteer.' ¹ The Quartermaster's Department on April 1st 'was amply provided with all necessary clothing and equipage for three months for the Army as then organized and for probably 10,000 additional troops.' On April 23d, it was confronted with the problem of clothing and equipping 125,000 men, and on May 25th, the second call for 75,000 volunteers was issued. In addition there were ten regiments of immunes, three regiments of United States Volunteer Cavalry, and three of United States Volunteer Engineers.

The departments were confronted by the following statute (Sec. 3679, Revised Statutes): 'No department of the Government shall expend in any one fiscal year any sum in excess of appropriations made by Congress for that fiscal year, or involve the Government in any contract for the future payment of money in excess of such appropriations.' The Quartermaster's Department had 57 officers, and the acts of Congress, approved April 23d and July 7th, allowed the appointment of 121 volunteers. For half a century it had not been necessary to send large bodies of troops to foreign shores, and the department had no transports. That the Quartermaster's Department had its troubles is not surprising. That those troubles made more trouble for the Medical Department was inevitable, as this was absolutely dependent upon the Quartermaster's Department for all transportation and many supplies. All departments had troubles, but these two had most. Of all of the staff departments that of the Adjutant General showed up best. The Dodge Commission praised it, and, in arguing for a general staff, Secretary Root testified before committees in Congress in 1902 that that department had done the work of a general staff during the war.

What of the Medical Department's preparation? Under the statute cited, it had left in the storerooms of post hospitals a portion of the last semi-annual issue of stores. It had not yet received any of the next year's supplies. For many years the successive Surgeon Generals had appealed for more officers, on the

¹ R. A. Alger: *The Spanish-American War*. Harpers and Brothers, 1901, p. 22.

ground that the Medical Corps was too small for the work of peacetime. Instead, Congress had in 1894 reduced the number of assistant surgeons by fifteen. It had also prohibited the further employment of contract surgeons. After war came, on May 12, 1898, it *restored the fifteen assistant surgeons and again authorized the employment of contract surgeons*. The act of April 22, 1898, provided for a chief surgeon on the staff of each commander of a corps, division, and brigade, and the President construed this broadly, and appointed seventy-seven surgeons from civil life. He also appointed a surgeon and two assistants for each regiment of United States volunteer infantry, cavalry, and engineers. During the war about 700 acting assistant surgeons were employed under contract. There were in the whole army 177 regular medical officers with any military experience.

The Hospital Corps on May 1st consisted of 99 hospital stewards, 100 acting stewards, and 592 privates. By Act of Congress of June 2, the number of stewards was increased to 200. The Act establishing the volunteer force (April 26) authorized a hospital steward for each battalion, but no provision was made for a hospital corps, though 25 privates for each regiment and 50 additional for each division had been asked for by the Surgeon General. Such regiments of the National Guard as had hospital corps had to disband them. The result was that the old system of detailing nurses and attendants in hospitals had to be resorted to, as in the days of the Mexican and the Civil Wars. There were no women nurses, nor any authorized.

‘At the commencement of hostilities the Medical Department had few medicines and practically no hospital furniture. The economy with which it had for years been administered, due to lack of appropriations by Congress, except for the annual needs of the Army, had prevented accumulation of any reserve stores. No contracts, even provisional, had been made during the months of March and April to provide proper furniture and food stuffs, funds not being available.’¹

¹ *Dodge Commission Report*, I, 172.

When the regiments of the Regular Army were ordered to camps of mobilization, they were directed to take with them from their stations such medicines and hospital stores as they had on hand. Whether because there were none on hand or because there was not transportation provided for them, some regiments reached the camps with practically no supplies. The medical supply depots being practically empty, the Surgeon General on May 3d telegraphed the governors of the various States, asking them to send with the troops from their States all medical supplies. Sixteen States had none and no State had enough for its troops. Most regiments arriving at Camp Thomas and Camp Alger were without medicines or hospital stores.

It was held that the national defense fund could be used, prior to the declaration of war, only for coast defense and naval purposes, the protection of men from disease not being considered a part of national defense. So the Medical Department could make no preparations and lay in no stores until Congress had appropriated for them after the declaration of war.

By May 1st, as soon as possible after war was formally declared, contracts were made for medical and surgical field chests of the patterns already determined upon and delivery was to begin in two weeks. This last did not prove practicable and no chests were delivered for a month and none supplied with their contents and issued until still later. However, on May 12th, supplies were packed in common boxes and sent to the regiments and places most in need of them. Officers in the field were also given authority to purchase medicine, but the opportunities for purchase in the field did not always exist.

Special supply depots were established at Lytle, Georgia, at Tampa, Florida, and at other places near large camps, but it took time and labor to establish, stock, and get them to operating, and complaints of shortage in organizations and in camps were widespread and exigent, official reports, inspection reports, newspaper articles, letters from Congressmen, parents, and self-constituted critics kept the War Department and the Surgeon General in-

formed of shortcomings and insured that they should not become self-satisfied or boastful.

The supply table, known to regular medical officers and fairly satisfactory, was strange to the new volunteer, did not contain his favorite proprietary remedies, and the articles named in it could not be obtained by the writing of a prescription to be handed over to the patient. In other words, the doctor had to stock and run his own drug store, and he was as much inconvenienced by this necessity, as much at a loss as to how to proceed, as if he had had to do the same thing in civil life. The wails concerning 'red tape,' which really meant business methods for the most part necessary, were loud and shrill. The making-out of a requisition for supplies is exactly equivalent to making out an order for their purchase in civil life, but many new officers resented it as red tape. At some places (the Dodge Commission cites Camp Thomas) chief surgeons made the process unnecessarily difficult by unwise restrictions upon the manner of asking and the things which might be asked for. If, when the requisition had been made and approved, the depot did not have the articles to issue, no word milder than *damn* was found applicable. On top of these troubles came the draining of regimental supplies for the equipment of division hospitals. Quotable words failed the regimental officers.

All of these complaints focussed at the Surgeon General's desk and it is probable that the gentleman sitting there wished many times that he might again be 'fooling with the microscope.' Other troubles, however, were properly attributable to the Quartermaster's Department, and were so attributed by the Dodge Commission, although the Medical Department received much of the blame at the time. In the interest of history, and not to try to 'pass the buck' at this late day to a department as unfortunate and as handicapped as our own, some of these faults will be mentioned.

In the earlier weeks of the war, the Quartermaster's Department objected to making shipments by express, because of the cost, and many times there were shortages of supplies because

shipments had been made by 'fast-freight' and were weeks in arriving. Many shipments of drugs were, of course, made in less than carload lots and were loaded with other supplies. Miles of trackage were blocked with unloaded cars, the contents of which were unknown, and to secure a particular package was quite like finding a needle in a haystack. In one instance the complete outfit for a 200-bed hospital was lost for weeks.

Conditions were even worse when the transportation was by sea. Medicines, stores, and hospital furniture were put in holds of transports for Cuba and Porto Rico under other freight, could not be unloaded when needed, and were carried about the high seas for weeks. The transports *Grande Duchesse*, *Mobile*, and *Concho* all afforded examples of this.¹

The medical supplies for the Cuban expedition were grievously mishandled. General Shafter personally accepted responsibility for shortage of ambulances, but many other supplies actually loaded on the transports were not unloaded for long periods. Some regimental outfits which were unloaded, could not be used because there was no means of transporting them from the beach. It was fortunate, but humiliating to the Service, that the Red Cross was able to and did furnish supplies to make good many of these governmental deficiencies.

The expedition to Manila, as will appear later, fared better than either the Cuban or the Porto Rican.

In the early weeks of the camps of instruction (Alger, Thomas, and Tampa being the large ones), there was relatively little sickness, despite insufficiency of shelter, poor sanitation, poor cooks, untrained officers and men. Some regiments had brought typhoid fever from their State camps. The Fifteenth Minnesota, remaining at St. Paul and Fort Snelling, had had 260 cases in August, in a total strength of 1323.

Malaria appeared early in the Southern camps, and in the general absence of laboratory diagnosis of fevers, most cases of fever were called malaria, including very many cases that the

¹ Dodge Commission.

Reed Board later considered typhoid fever, or which were actually shown to be such by the clinical course and later deaths. In May, about 6.75 per cent of the men were sick, in June twice as many, in July one third more than in June, and the death rate was three times as great. In August, the sickness was one half greater than in July and the death rate had again doubled.¹ In September, the sickness and death rates both dropped materially. Sixty per cent of the sickness in July, August, and September was malaria, typhoid, dysentery, and diarrhœa, more of it typhoid and dysentery than was then recognized. Eighty per cent of all deaths were attributed to typhoid.

At Camps Alger, Thomas, Meade, Wikoff, at Tampa, Jacksonville, and in Santiago and Porto Rico, there were reported 13,770 cases of typhoid with 906 deaths. The Reed Board later expressed the opinion that not more than half of the cases of typhoid had been correctly diagnosed.

At first only regimental hospitals were used, although these had been thoroughly discredited in the Civil War. They were not even provided with Hospital Corps men, but drew their personnel by detail from the line, personnel not only untrained but uninterested in such work and probably, in many instances, detailed to it because they were poor soldiers or were themselves sick and unable to do line duty satisfactorily.

Gradually it became apparent that typhoid was epidemic. The knowledge was not welcomed, and the Dodge Commission reports that 'In one instance, to which attention has been called, the surgeon in chief at Chickamauga, under a threat of court-martial, compelled a surgeon to retract his statement that typhoid fever was epidemic, though in point of fact it was epidemic.' The reasons ascribed for these epidemics are numerous, but fundamentally they are one, ignorance. There was ignorance of the epidemiology of typhoid, that it was conveyed in other ways than by polluted water, ignorance of sanitation in general and of camp sanitation in particular, ignorance of proper precautions to be

¹ *Dodge Commission Report*, I, 177.

taken in the preparation and handling of food, ignorance of the danger of having sick men in kitchens, ignorance of the accurate methods of diagnosis which are now employed as routine in camps and hospitals, ignorance of the existence of typhoid carriers. For this ignorance no one person was to blame, it was the characteristic of the day. At present it seems strange, almost unbelievable, but it would be as rational to blame the Quartermaster's Department for not then knowing about motor transportation, the Signal Corps for not having wireless communication, or the then non-existent Air Corps for having no airplanes as to blame the Medical Department for not having the information which was yet hidden in the womb of Time.

There is no doubt that there was great haste and great lack of preparation in effecting mobilization, that sanitation was wretched and conditions disgusting, that flies abounded and went from sinks to kitchens, that sinks were undug for days while the soils of camps were being polluted, that when dug they were poorly cared for, that a thousand criticisms can now be made of things done or left undone. It is equally true that about nine hundred of these criticisms would be directed at ignorance which was general, dense, and characteristic of an era which was then passing, and the passing of which was expedited by the sad experiences of this war.

Yellow fever, as it prevailed among the troops in Cuba, was relatively mild, but it likewise was due in large part to ignorance, an ignorance clearly shown by the burning of the town of Siboney to get rid of the infection.

There were comparatively few wounded in the Spanish-American War — 1581. The first-aid packet protected most of these from infection and wound infections were not a major problem. The doctors used the knowledge available in nearly all circumstances, did splendid work, and received and deserved the following tribute from the Dodge Commission: 'Praise should be given to the well-trained, faithful, hard-working and overworked surgeons, who, on the fighting line and in the hospitals thoroughly discharged their duty, and who, as General Young has said,

"deserve the thanks of the American people for their splendid work."

As stated above, the first hospitals were poorly equipped, regimental affairs. Circular No. 3, S.G.O., May 18th, did away with these, directed the establishment of division hospitals of two hundred beds each and directed that regimental outfits be turned in for the purpose of equipping these. As these were supposed to be mobile, very serious cases of sickness or those apt to last long were to be sent to general hospitals. Typhoid cases soon filled the division as well as the general hospitals and immobilized the former. Because of the shortage of doctors, it was also necessary to take surgeons or their assistants from regiments. Regimental and local pride, sentiment and self-interest were touched and became vocal. Regiments, governors, Congressmen, and the public protested. The sick were kept in their regiments as long as possible and had improved opportunities for distributing their diseases. The new hospitals were in command of new officers, ignorant as a rule of the details of hospital equipment and administration, and working with Hospital Corps men as ignorant of nursing as the ordinary young man from farm or office.

General hospitals were established at Key West, Fort McPherson, Fort Thomas, Fort Monroe, Chickamauga, and Washington, and the post hospitals in New York Harbor, at the Presidio of San Francisco, and at Vancouver Barracks were so expanded as to be practically such. There were few complaints from these, and the writer, having been stationed at Fort Thomas and knowing from observation the wretched preparation made and poor conditions obtaining there up to August, is convinced that this fact in itself shows that the worst conditions in division hospitals must have been very bad indeed.

Large numbers of sick were sent to civil hospitals, chiefly in New York and Philadelphia, after the middle of July, and the pressure on Army hospitals thus reduced. Thousands of men were furloughed to their homes and took their diseases there.

Practically the entire army returned from Cuba to Montauk

Point was sick, and for weeks there was a constant struggle to provide shelter for the patients, and these were often at the hospital hours before the shelter was ready. Visitors came by thousands, many of them looking for friends who could not be located. Doctors and nurses had their work interrupted many times daily to look for sick men who could not be found. But, owing to civilian aid, there was then plenty of food and good cooks at Montauk. 'The history of these Montauk hospitals is the history not of careful, thorough preparation and smooth administration, but of hurried adaptation to extraordinary demands. In less than sixty days after the time when the site of Camp Wikoff was a waste, over 10,000 sick had gone through the hospitals — general, detention and division — over 4000 more had been examined, if not treated, at their regimental hospitals, and neither typhoid nor yellow fever had become epidemic in the camp.'

The feeding of the sick in the early weeks of the war caused much criticism, which the facts justified. The hospital stores contained wines, liquors, condensed milk, beef extract and tea. Otherwise the diet was derived from the ration and from purchases made from hospital funds, and most organizations had no hospital funds. It was thus very difficult or impossible to provide proper diet for the typhoid and dysentery cases which constituted the larger part of the sick report. Organized and individual charity contributed largely to correct this evil, and on August 10th a ration commutation value of sixty cents was ordered for the sick in general hospitals, hospital trains and transports, and this allowance was later extended to all the sick. Thereafter the food was good and abundant.

The Surgeon General was prompt in his recommendations for suitable transportation for the sick, both hospital train and hospital ship, but there was delay in approval of the recommendation and further and necessary delay in converting the boats to their new uses. The Relief and the Missouri were excellent hospital ships when completed; the Olivette was less complete but

was ready sooner. She was made a hospital ship by the simple expedient of providing her with a field hospital's equipment. The Massachusetts Volunteer Aid Association furnished a hospital ship, the Bay State, which brought 336 sick from Santiago and Porto Rico.

The hospital train was put in service on June 16th, and in the next two and a half months it carried about two thousand patients, with but four deaths.

In 1899, after the turmoil and the shouting had to a certain extent died down, and with the facts before him, the Surgeon General discussed at some length in his annual report the subject of typhoid during the war. His discussion is interesting, particularly when it is recalled that he was a — if not the — leading sanitarian of his day and that he had just witnessed and studied, and had had studied very great epidemics of the disease. He was still (from our present point of view) largely ignorant of its epidemiology, as was Walter Reed, who reported as follows upon an explosive outbreak in the Eighth Cavalry, seventy-seven cases in one month, fifty-three of them in one week:

'To sum up briefly the occurrence of typhoid fever in the Eighth Cavalry, I find that the disease was imported by this regiment into its Cuban Camp, but was mistaken by the various medical officers on duty with the regiment for malarial remittent fever until the epidemic had reached serious proportions, that it was clearly not due to water infection, but was transferred from the infected stools of patients to the food by means of flies. . . .

'I further find that, even when the character of the epidemic had been ascertained, both the regimental surgeon and the chief surgeon of the department exhibited a most astonishing ignorance of camp sanitation, in that they failed to recommend the one radical measure for the protection of the command, viz., the removal of the regiment from the infected camp site.'

No word of food or kitchen infection, an expressed belief in place infection as the cause! In his report of his inspection of the sanitation of the camp there is no mention of flies, and of latrines

he said, 'Open wooden boxes about 8 feet long and 20 inches wide are furnished for the reception of excreta, and dry earth furnished for covering the latter. These boxes were removed and emptied daily by Cuban scavengers.'

Another interesting item in General Sternberg's discussion of the typhoid was his comparison of its epidemiology in the Civil and the Spanish-American Wars. 'The outbreak of typhoid fever in the Regular Army in 1898 was more fulminant than in the volunteer camps of the civil war, notwithstanding our better knowledge of the causes of the disease and the better control of sanitary conditions with which the discipline of regular troops should be credited.' Could this have been related to the fact that there were no company messes in the Civil War until 1863, that regulations (Par. 118, A.R. 1861) prescribed that 'Messes will be prepared by privates of squads, including private musicians, each taking his tour. The greatest care will be observed in washing and scouring the cooking utensils: those made of brass and copper should be lined with tin'?

The Dodge Commission published the following conclusions and recommendations in regard to the Medical Department:

GENERAL CONCLUSIONS AND RECOMMENDATIONS

To sum up, in brief, the evidence submitted shows:

1. That at the outbreak of the war the Medical Department was, in men and materials, altogether unprepared to meet the necessities of the army called out.
2. That as a result of the action through a generation of contracted and contracting methods of administration, it was impossible for the Department to operate largely, freely, and without undue regard to cost.
3. That in the absence of a special corps of inspectors, and the apparent infrequency of inspections by chief surgeons, and of official reports of the state of things in camps and hospitals, there was not such investigation of the sanitary conditions of the army as is the first duty imposed upon the Department by the regulations.

4. That the nursing force during the months of May, June, and July was neither ample nor efficient, reasons for which may be found in the lack of a proper volunteer hospital corps, due to the failure of Congress to authorize its establishment, and to the non-recognition in the beginning of the value of women nurses and the extent to which their services could be secured.

5. That the demand made upon the resources of the Department in the care of sick and wounded was very much greater than had been anticipated, and consequently, in like proportion, these demands were imperfectly met.

6. That powerless as the Department was to have supplies transferred from point to point, except through the intermediation of the Quartermaster's Department, it was seriously crippled in its efforts to fulfill the regulation duty of 'furnishing all medical and hospital supplies.'

7. That the shortcomings in administration and operation may justly be attributed, in large measure, to the hurry and confusion incident to the assembling of an army of untrained officers and men, ten times larger than before, for which no preparations in advance had been or could be made because of existing rules and regulations.

8. That notwithstanding all the manifest errors, of omission rather than of commission, a vast deal of good work was done by medical officers, high and low, regular and volunteer, and there were unusually few deaths among the wounded and the sick.

What is needed by the medical department in the future is —

1. A larger force of commissioned medical officers.

2. Authority to establish in time of war a proper volunteer hospital corps.

3. A reserve corps of selected trained women nurses, ready to serve when necessity shall arise, but, under ordinary circumstances, owing no duty to the War Department, except to report residence at determined intervals.

4. A year's supply for an army of at least four times the actual strength, of all such medicines, hospital furniture, and stores as

are not materially damaged by keeping, to be held constantly on hand in the medical supply depots.

5. The charge of transportation to such extent as will secure prompt shipment and ready delivery of all medical supplies.

6. The simplification of administrative 'paper work,' so that medical officers may be able to more thoroughly discharge their sanitary and strictly medical duties.

7. The securing of such legislation as will authorize all surgeons in medical charge of troops, hospitals, transports, trains, and independent commands to draw from the Subsistence Department funds for the purchase of such articles of diet as may be necessary to the proper treatment of soldiers too sick to use the army ration. This to take the place of all commutation of rations of the sick now authorized.

Convalescent soldiers traveling on furlough should be furnished transportation, sleeping berths or staterooms, and \$1.50 per diem for subsistence in lieu of rations, the soldier not to be held accountable or chargeable for this amount.

These are the findings of the Dodge Commission. In general terms it may be stated that the Medical Department could not have been worse handicapped by mere neglect of its needs. Actual hostility to it could have crippled it more, but there is no reason to suspect that either Congress or the executive authority felt that. It was neglected because it cost money and was looked upon as a non-combatant branch of very little importance. Few mistakes are more costly. It made its own mistakes, but the two most important were understandable. They were the estimate that hospitalization for one per cent of the command would suffice in camp and general hospitalization for 3.5 per cent, and the belief that typhoid was mainly, if not entirely, water-borne. The estimate as to hospitalization was founded on the garrison experience for some years past. The belief as to typhoid was in accordance with the advanced medical opinion of the day, and even the Reed-Vaughan-Shakespeare report on that disease in

the camps, a monumental work which shed much light on the disease, entirely missed what to-day seems the most probable and common single factor in the causation of the epidemics, the presence of carriers or sick men in kitchens. Not one of that board's fifty-seven findings suggests that it considered such a factor. Let us consider its probability. Among the important findings of the Board are the following:

(1) *During the Spanish War of 1898 every regiment constituting the First, Second, Third, Fourth, Fifth and Seventh Army Corps developed typhoid fever.*

(2) *More than ninety per cent of the volunteer regiments developed typhoid fever within eight weeks after going into camp.*

(a) Thirty-five regiments, or 33.01 per cent, reached the national encampments with developed cases of recognized typhoid fever.

(b) Eighteen regiments developed recognized typhoid within fourteen days after arrival at national encampments.

(c) Thirteen additional regiments developed recognized typhoid fever within 21 days after reaching national encampments. Thus, 3 weeks after arriving at the national encampments 66, or 62.26 per cent, out of the 106 regiments, had cases of typhoid fever. . . .

If our claim be accepted that the cases designated as probable typhoid fever were really due to this disease, the following conclusions may be drawn: . . .

(c) Eighty-six, or 82.26 per cent, of the 106 regiments, had developed typhoid fever within three weeks after reaching national encampments.

(15) *Camp pollution was the greatest sin committed by the troops in 1918.*

(26) *Infected water was not an important factor in the spread of typhoid fever in the national encampments.*

(28) *Flies undoubtedly served as carriers of the infection.*

(30) *Typhoid fever, as it developed in the regimental organizations, was characterized by a series of company epidemics, each one having more or less perfectly its own individual characteristics.*

(32) *A command badly infected with typhoid fever does not lose the infection by simply changing location.*

(33) *Even an ocean voyage does not relieve an infected command of its infection.*

(45) *About one-fifth of the soldiers in the national encampments in the United States in 1898 developed typhoid fever.*

(47) *The percentage of death among cases of typhoid fever was 7.61.*

(54) *The deaths from typhoid fever were 86.24 per cent of the total deaths.*

(55) *The morbidity from typhoid fever per 1000 of mean strength was a little less than one fifth (192.65).*

(56) *The mortality from typhoid fever per 1000 of mean strength was 14.63.*

(57) *The average period of incubation is about 10½ days.*

Let us consider in connection with these findings the following well-known facts:

(a) Officers with knowledge of camp sanitation were very rare.

(b) Nobody knew anything about typhoid carriers. Nobody appeared to realize that men in the early stages, even in the incubation period of the disease, might be eliminating vast numbers of typhoid bacilli.

(c) Owing to lack of volunteer Hospital Corps, men were in the early weeks of the war detailed from companies to act as attendants in hospitals. Their chances for obtaining infection were excellent.¹

(d) Duty to kitchen police was by detail from roster, a practice still rather common in the army. Men returning from hospital would soon be detailed to kitchen police and, if infected with typhoid, would be apt to infect the company's food.

¹ At the general hospital at Fort Thomas, Kentucky, there were no nurses and a very few (probably six or eight) men of the Hospital Corps when the first trainload of typhoid cases, about two hundred in number, arrived from Chickamauga. The writer was at the time a contract surgeon there and his home was twenty miles distant. By telephone he called upon his home town for help. About twenty young men and boys responded. They were given a talk as to the dangers of infection and advised as to how to avoid them, and set to work as nurses. Several of them, including a brother of the writer, contracted the disease.

(e) Neither stool nor blood culture was then in use in diagnosis; the clinical symptoms and the Widal reaction would seldom assure it before the end of the first week of sickness. It is therefore probable that a large proportion of cases having recognizable typhoid by the end of their third week in camp had acquired the infection elsewhere and had been on kitchen police while sick. Men acquiring the disease from them took their turns at kitchen police. This is the classical history of company epidemics and the Reed Board found the large epidemics made up of company epidemics. [Finding (30).]

(f) Few militia companies at that time had good cooks; many had none. Men were transferred to supply such companies, at times on the basis of kitchen police work in older regiments.

(g) Many medical officers attributed outbreaks of typhoid to food, but it was always to 'tainted meat,' 'stale pies,' 'unripe' or 'over-ripe fruit,' 'soft drinks,' etc., never to food contaminated by cook or kitchen police.¹

(h) The facilities for personal cleanliness by kitchen personnel were not usually good. The Dodge Commission reported, 'the water supplied the camp was obtained from the springs above mentioned, hauled in barrels furnished by the Quartermaster's Department to the different regimental organizations. . . . The water supply at Camp Thomas was at times insufficient for comfort.' At Camp Alger 'the water supply was also quite limited and never was sufficient for other uses than cooking and drinking, and not that until about the 25th of June.' At Camp Wikoff, Montauk Point, 'about 12 miles of pipe were laid from these wells, and the water carried to each regiment, where there was one faucet or more from which it could be drawn.' One faucet to a regiment is not a large allowance.

¹ That the Medical Department was not out of step with the world in this oversight is indicated by the facts that the same thing likewise occurred throughout the equally severe typhoid epidemics of the Boer War, and that Osler's 'Practice of Medicine,' the most popular English textbook on medicine in generations and one sold in such immense editions that its revision was frequent and thorough, did not mention 'carriers' until the seventh edition, published in 1909. The human mind as a rule sees only as far as it is trained to see.

(i) The literature on bacillus carriers has now become large, but it began in America with Dr. George Soper's report of the famous case of 'Typhoid Mary' in June, 1907.¹ In the following year Dr. W. H. Park, Health Officer of New York, wrote: 'We have, therefore, found typhoid bacilli in the stools of six per cent of the cases examined. During the autumn we examined the feces from a large number of persons convalescent from typhoid fever just as they left the hospital and found bacilli persisted in the feces of about 5 per cent. It was impossible to trace the cases further. . . .

As the majority of typhoid cases occur before the age of 30, the average life of typhoid carriers is fully 25 years, so that we have the somewhat appalling fact that there are at least as many recovered cases who are typhoid carriers as there are typhoid cases in any year and that, besides these, there are the typhoid carriers such as the cook (Typhoid Mary) who never had typhoid.'²

(k) Welch, Dehler and Havens found 5.1 per cent of typhoid and paratyphoid carriers among 1076 healthy dairy employees in Alabama in 1925, despite the low general incidence of the disease by that time.³

These facts will doubtless be interpreted by each reader — at least by each medical reader — to conform to his already formed opinions. They strongly suggest to the writer that the Reed-Vaughan-Shakespeare Board, the Medical Department, and the medical profession missed the best bet of the day.

Huxley said, 'The world is neither wise nor just, it makes up for its folly by being damnably sentimental.' America had been unwise and unjust in regard to the Army for a full generation, the results were promptly apparent when war came, and like the poor carpenter who blames his tools, the public projected its own faults and neglects upon its neglected tools, the War Department and its bureaus. It loosed a flood of emotions which represented

¹ *Journal American Medical Association*, 1907, XLVIII, 2019.

² *Ibid.*, 1908, LI, 981.

³ *Ibid.*, 1925, LXXXV, 1036.

mainly efforts at self-justification, sometimes, as in the sharp reversion of sentimentalism in regard to Admiral Dewey,¹ not even explainable on that ground, but just an hysterical transition from tender love to angry tears.

Of course the Congress, the Administration, and the Army profited by the bitter lessons. Money was appropriated, all of those in authority were blamed and vilified, investigations were started and pushed with vigor, more hospitals were started, more contract surgeons were employed, trained women nurses were put in the hospitals, sick men were furloughed by thousands and took their diseases home with them. The Dodge Commission reported: 'The rapidity with which commanding officers of corps, divisions, brigades, regiments, and officers of the staff departments have profited by the first six months of service is shown by the improvements in the new camps, their location, water supply, and sanitary arrangements. The weak spots in the first arrangements for camping troops were soon discovered, and it was learned that with proper system and little expense they could be camped under favorable sanitary conditions. The present camps are models, the hospitals adapted to the comfort and the care of the sick, the grounds clean, and the sanitary conditions greatly improved.'

And fortunately, the war ended soon. Santiago was surrendered on July 16th, Manila four weeks later, but on August 12th a peace protocol² was signed and a Peace Commission was to meet in Paris. On December 10, 1898, the treaty of peace was signed. Spain was deprived of the last of her once great colonial posses-

¹ See *Our Times*, by Mark Sullivan (Charles Scribner's Sons, 1927), 329-43.

² 'The signing of the protocol with the Spaniards brought us great trouble. The men had volunteered for the war, and now that the war was over they could see no reason why they should not lay down their guns anywhere they happened to be and walk home. As many as three hundred men would be reported absent without leave from a single regiment. Our wars are so short that we never have time to discipline our men thoroughly. Their *esprit* is most admirable while they are being trained; they are full of purpose and remarkably well behaved. But the end of the war brings a slump in everything.' Major General Hugh L. Scott: *Some Memories of a Soldier* (Century Company, 1928), 226.

sions, and adolescent America assumed the adult responsibilities summed up in Kipling's verses, 'The White Man's Burden.' Except for the last four lines, this poem was accurately prophetic. We still hope that those lines may not prove so.

CHAPTER VII

THE CAMPAIGNS

BUT before we took up the white man's burden, we had to finish our war, to spend more emotions, health, and lives, to start to learn how to bid the sickness cease.

THE SANTIAGO CAMPAIGN

The emotions, as already stated, did not all relate to the sick soldiers. The plans of campaign, first considered after war was declared, were improvisations and generalizations. They were frequently changed under the influence of the fear of a real or a mythical Spanish fleet, the latter off our Atlantic coast. On April 29th, General Shafter was ordered to sail 'to the south side of Cuba, under convoy of the ships of the United States Navy, and land your force, or such portion of it as you may deem advisable, and penetrate far enough into the interior to form a junction, if practicable, with General Gomez's forces.' Secretary Alger later wrote:¹

'As is well known, this expedition did not sail, for the reason that the Spanish fleet had been reported about that time at the Cape Verde Islands.

'On the 2d of May, a conference was held at the Executive Mansion for the purpose of discussing questions of military policy and plans of campaign. Those called in consultation by the President were the Secretary of the Navy, the Secretary of War, the Major General Commanding, and Admiral Sicard. The result of the conference was a decision to send a force to Cuba with a view to formally investing the city of Havana.

'While preparations for this new and most important move were under full headway, word came that Cervera's fleet had appeared off the island of Martinique. . . . The Secretary there-

¹ *The Spanish-American War.* Harper and Brothers.

fore countermanded, on the 13th of May, the orders previously issued. . . . This definite information concerning Cervera compelled the Government to lay aside all plans that had been considered up to this time. . . .'

'During this period numerous conferences were held at the Executive Mansion for the purpose of considering plans of campaign.' General Miles submitted several plans which were rejected as 'impossible and impracticable,' one for an attack on Nuevitas, which 'would have necessitated the lightering of 15,000 or more horses, in addition to men and supplies, over a distance of fifteen miles'; one 'recommended the shipment of 12,000 men to Key West, where all drinking-water would have to be brought in tank ships. . . . He insisted on sending to Cuba, for use with infantry operating in a tropical jungle and over a country impassable to vehicles, his "portable" shields, each weighing one thousand pounds and each occupying as much room on a transport as a hospital ambulance,' etc.¹

The Spanish fleet had been located, May 19th. On June 7th, a dispatch was received from Admiral Sampson saying that he had bombarded Santiago the day before and that 10,000 men could take the city. Thereupon General Shafter was directed to 'sail at once, but with not less than 10,000 men.' That evening his transports started down the bay with 17,000 men, insufficiently supplied with wagons, tentage, and hospital equipment. 'But, just at that supreme moment, the phantom Spanish fleet, which, only a few weeks before, had appeared off Sandy Hook and thrown our whole Atlantic Coast into a panic, revealed itself a second time with equally unfortunate results.' It was this time announced by Admiral Remy, and the Secretary of the Navy requested recall of the transports. Just as the last ship was moving out of Port Tampa, General Shafter received orders to halt the expedition. The men were kept on the transports, suffering from heat and crowding, for a week, before it was learned that the 'ghost fleet' were three of our own vessels, the *America*, *Scorpion*,

¹ Alger: *The Spanish-American War*.

and Supply. Then the expedition sailed. It arrived off Guantánamo on June 20th, and two days later it landed at Daiquiri, the horses and mules being put overboard to swim ashore. There were 71 medical officers and 89 newspaper correspondents, who got ashore in one way or another, the former to experience many troubles, the latter to cause many.

Reviewing the report of Lieutenant Colonel Pope, Chief Surgeon of the expedition, we find that field hospitals and ambulance trains had been formed at Tampa by the following expedient:

'The Chief Surgeon of the Fifth Army Corps will assign for division hospital and ambulance train service such members of the Hospital Corps detachments, tentage, ambulances and wagons, animals and their equipments, hospital and medical supplies and field equipments, as may be required, and designate the medical officer to receipt for the same.

'A minimum allowance to be retained with each regiment will be as follows:

'One acting hospital steward and one private, one hospital and one common tent, one ambulance and necessary animals fully equipped in order to preserve the regimental organization.'

In this way three field hospitals of 65 to 150 beds each, and two ambulance trains of seven and ten ambulances each were formed. The ambulance trains were left behind when the army sailed, but one of them, under Lieutenant J. M. Kennedy, got over later in time to be of great service. Three ambulances, which had been taken apart and stored in a transport, were taken with the expedition.

Medical supplies shipped to Tampa were usually lost in the general congestion of freight yards, but some drugs were purchased in Tampa, and just before the sailing a shipment came through. There was a shortage of litters. Where there should have been ten to a regiment there were often but two, sometimes none.

Twelve thousand first-aid packets were received before sailing and were issued to brigade surgeons for distribution.

There was no good harbor or wharfage at Daiquiri and few lighters and boats, so that days or weeks were consumed in getting ashore such supplies as had accompanied the expedition.

The first fighting was at Las Guasimas on the 24th of June. Leonard Wood's regiment was engaged and it sent in fifty-two wounded who were transferred to the extemporized hospital ship, the Olivette.

'This early battle gave the first illustration in actual warfare of the value of the first-aid dressings. All of the wounded showed most careful application of the dressing. The action of July 1, 2, and 3 enabled the Medical Department to show up well despite its handicaps. The bearing of men and officers was conspicuously fine. All of the wounded showed most careful primary dressing, fractures were well splinted. The transportation of the wounded from battle field to hospital, three miles, was mainly by litter and three ambulances. The wounded at El Caney were treated there by Major Ebert and later sent in in wagons. At the earliest practicable date all wounded were sent to Siboney. The hospital there was under command of Major Louis A. La Garde, from whose report the following extracts are taken.

'Tables were taken from the offices of the Juragua Company's offices and other buildings, to hold dressings, instruments, etc. The water main of the little town was tapped opposite the operating room so that water was provided in abundance. With few exceptions our assortment of instruments was liberal, having provided ourselves from Fort Robinson, upon taking the field; and later when Dr. Fauntleroy joined us at Port Tampa, on the eve of sailing, he brought a large assortment. In this way we had instruments sufficient to supply six tables very nearly. A few instruments were furnished by Major Nancrede, United States Volunteers, and Dr. Lesser, of the American Red Cross Society. The vexed question of sterilizing dressings in the field was overcome by the abundance of clean dressings so handsomely prepared by the makers, and abundantly furnished by our department.

'On the morning of July 1 we were ready for the reception of

200 wounded. We soon learned that an advance of our line had been ordered and that the troops were engaged in battle. Our base was practically stripped of soldiers. The Thirty-Third and Thirty-Fourth Michigan regiments, under General Duffield, who commanded at Siboney, had been ordered, on the night of June 30, to make a demonstration on Aguadores, on the left of our line, along the Juragua railroad, eight miles to the west. His command, which was entirely composed of infantry, fared badly in running upon some batteries which poured shell and shrapnel into it, causing a rather precipitate retreat. A train bearing two dead and seven wounded steamed in front of the operating room, accompanied by Majors Nancrede and Vaughan, shortly after noon. The wounds were caused by fragments of a shell, necessitating two amputations, one of the forearm and the other of the thigh. Later in the day some of the less severely wounded commenced to arrive from the main line. Their reports of the extent of our casualties were necessarily inaccurate and conflicting. At about 10 P.M., a teamster rode into camp on one of his mules, stating that a train of eight wagons of wounded was blocked on the road to our advance, four miles away, and that men were needed to extricate the wagons from the mud.

'I proceeded with the teamster to obtain an order from General Duffield for a detail of men. Before the detail had time to reach the sufferers they had received assistance from some other source. They reached the hospital at about daybreak. Many of the wounds had to be re-dressed. The injuries were not severe, as a rule. We busied ourselves in providing beef tea, coffee, etc. I regret to say that our outlay of delicacies was very limited. As stated already, we had depended for condensed milk, soups, oatmeal, lime juice, and other delicacies, upon our commissary department, which was well provided with such articles of light diet; but, for the lack of facilities to land, these articles were still on the transports. The landing of the troops was done in such a precipitate manner that ammunition and the bare ration of the soldier seemed by military necessity to be the first consideration.

It was at this time that I remembered the offer of the Honorable Clara Barton, president of the American Red Cross Association, through the corps surgeon, to assist us in any way she could with supplies and help from the State of Texas, which lay at anchor near our landing. I desire to testify herewith to the loyal manner in which this promise was kept.

'While the wounded for four days kept crowding into our hospital faster than large details of men could provide them with canvas shelter, Miss Barton's assistants worked unremittingly with us to relieve the pangs of suffering humanity. They furnished us, with willing hands, delicacies like gruel, malted milk, ice, soups, etc., when military necessity prevented us from getting our own. As the wounded crowded upon us in numbers far beyond anything we had reason to anticipate, they came forward with cots, blankets, and other articles for the comfort of the unfortunates. For such help at a moment of supreme need, coming from people in no way connected with the military service, the deep sense of gratitude, not only of the medical department, but of the whole of the Fifth Corps, cannot be conveyed by words. I desire to emphasize our gratitude in this manner because efforts have been made to make it appear that the medical department was not mindful of the extent of the services rendered; and, again, there are those who have attempted to minimize the efforts and preparations of the medical department of the army, while in their opinion, the bulk of the credit in the care of the wounded at Siboney belonged to the Red Cross Association. As far as my personal knowledge extends, the officers of the Red Cross Association are not responsible for such impressions. They are willing to accord to the medical department due praise for the work it had to accomplish under great difficulties. They understood the military situation which governed in the premises, and saw, as we did, our helplessness, for the time being, at least.

'The actions of the 1st, 2d, and 3d of July, as already stated, crowded our hospital to overflow. In addition to canvas shelter, a railroad shed was used for cases of measles. A small cottage con-

taining about twenty beds was turned over to the Red Cross Sisters, under Dr. Lesser, for wounded officers and men, and the large cottage, known as the Garcia headquarters, was used as a fever hospital, under Major John Guiteras, surgeon, United States Volunteers. The latter, who was the yellow-fever expert of the expedition, had inquired into the history of the last two of these buildings, and, from reports made to him by the Cuban population, he was reasonably sure that they were free from infection, which opinion, we regret to admit, was far from correct, as the sequel will show.

'At the same time that the kitchens were preparing diets day and night and that men detailed from the regiments were helping the regular Hospital Corps men to care for the wounded, the operating room was the most active part of the hospital. On the 2d of July, Drs. Nancrede and Fauntleroy, of the operating staff, requested me to ask the Sisters of the Red Cross to assist at the operating tables. The second day of work had convinced us that we were very much in need of those having special training in operating-room technique. The few men we had possessing the qualifications necessary in this department were not able to satisfy the wants of the five and six tables that were running constantly, day and night. Accordingly I applied to Dr. Lesser for the Sisters, four in all, I believe. I also extended Dr. Lesser an invitation to assist in the operating room. We thereby received the benefit of their skill during the rest of the work which followed for the next few days.' *

So rapidly did sickness increase in the army at Santiago that, on August 4th, General Shafter, supported by the certificates of nine general officers, Theodore Roosevelt, his own chief surgeon, and four division surgeons, notified the War Department that it was absolutely and immediately necessary that the army be withdrawn from Cuba. The generals had said, 'This army must be moved at once or it will perish.' The chief surgeons considered 'it to be their imperative duty, after mature deliberation, to

* Surgeon General, *Annual Report*, 1898, pp. 212-13.

express their unanimous opinion that this army is now in a very critical condition.' These documents constituted the famous Round Robin of 1898.

The War Department had already chosen Montauk Point as the site for a camp for returning troops. On August 5th, General S. B. M. Young was sent to establish the camp.

'Work was pushed on the ordered five detention camps for 1000 men each, with their hospital accommodations for 500, for through these camps had to pass all the men coming from Cuba. A general camp of new tents intended to station from 9000 to 10,000 men was ready for occupation before a transport came in. The general hospital was prepared for patients as fast as was permitted by the limited number of workmen and the delays in getting tents and lumber on the ground.

'When the work of preparing the camp had hardly commenced, before a single tent was pitched at Montauk Point, on the 7th of August troops began to come in from Tampa and other places in the Southern States, and within forty-eight hours there were, of these recruits and men left behind when the Fifth Corps sailed for Cuba, a force numbering 4293, and with it seven or eight thousand mules or horses. . . . It would certainly for every reason have been better if these men had not been ordered to Montauk. . . .

'It was about two weeks before the camp was in tolerable running order, and during this time troops kept coming in, all in "pitiable condition." . . .

'The sanitation of the camps and hospitals, while far from perfect, was perhaps as good as might reasonably have been expected.'¹

Colonel William H. Forwood was designated as Chief Surgeon of the camp at Montauk Point, and a few remarks are quoted from his report to the Surgeon General:

'At the station we found only a single railroad track ending at a small shanty on the barren sand bar. There were no switches,

¹ *Dodge Commission Report*, I, 217.

side ways, platforms, storehouses or other facilities for landing the thousands of carloads of freight, passengers and material soon to arrive. On Fort Pond Bay there was a narrow pier and a small fishing wharf, but the pier was not wide enough for the landing of a transport vessel and the fishing wharf was so insecure that a danger signal was placed across the entrance to warn people from walking out upon it. . . . On this day, August 4, the movement of troops from Santiago, with thousands of sick, was ordered to begin at once. . . . There were no teams, lumber, tents, men, or means at hand to prepare for their reception. . . . That night we returned to New York, the quartermaster to make contracts and order up men, teams, lumber, tents, boilers, engines, pumps, pipe, tanks, pile drivers, tugs, lighters, and a thousand things that were necessary for the work, and I to procure medical supplies, bedding, furniture, cooking ranges, etc., which I did for a hospital of 500 patients. . . .

'August 8. Late last night the Sixth United States Cavalry came in from Tampa, with thirty-six sick, including typhoid cases. This command had with it regimental wagons and ambulances, which was the first transportation available at Montauk. . . .

'August 11. The Red Cross yacht Admiral came into the harbor loaded with twenty tons of assorted supplies. . . . The Women's National Relief Association, through Miss Helen Gould, selected a corps of expert cooks and assistants — distinguished chefs from New York and Boston — and placed them at my disposal for service in the general and special diet kitchens of the hospitals. . . . From this time on the Army ration was supplemented by almost every article of food to be found in the larders of the best hotels in the cities. . . .

'August 12, four wards at the general hospital were completed and eighty patients were in bed under care of nurses. . . .

'August 13, the first transport from Cuba came into the harbor and fifty sick were landed and sent to general hospital the following morning. . . .

'August 15, the detention hospital received its first consignment

of 60 patients from the St. Louis, an infected ship. There were 210 sick in general hospital, with many vacant beds and plenty of supplies. . . .

‘August 16, we had 750 beds. . . .

‘August 18, the general hospital was completed and work on the annex begun. The Red Cross yacht reported. It had a capacity of fifteen beds. One medical officer, one male and two female nurses with all necessary medical supplies were placed on board and regular daily trips commenced, carrying sick mostly to New Haven, New London and Bridgeport hospitals. . . .

‘August 30, the steamer Shinnecock reported to me. . . . I placed 200 sick aboard to go to the military hospitals in New York. . . . The transfer of patients and the granting of furloughs continued, and the last of the transports from Cuba having arrived there were September 10, over 1000 vacant beds in the three field hospitals that in the short period of one month, had been constructed and equipped and had served for the treatment of 9000 patients.’

THE MANILA CAMPAIGN

The expedition to Manila sailed in May, June and July with something over 15,000 men; some reports said 18,000. It was not blessed with so many newspaper correspondents as the Cuban expedition, nor such prompt telegraphic and mail facilities. Manila was so distant, in such unknown surroundings, that the romancing in regard to it, much less than related to Cuba, concerned itself with such exotic and picturesque subjects as Malay pirates, Chinese coolies, and head-hunters, rather than with diseases and camp sinks. And it was all so strange and new to the soldiers that when their letters began to reach home, they dealt more with the big-horned carabao, the tall bamboo, the medieval religious processions, and the shirt-tails worn outside of the trousers than with embalmed or canned beef. So it went off rather happily. It is true there was sickness, some fighting, some looting, but there were also the ‘Days of the Empire,’ days of adventure,

of cheap servants, cheap drink, cheap women, and strange sights. The men were 'somewhere east of Suez,' and very superior, very swaggering. At times they even were very bad, and they were storing up experiences which the unregenerate, in their now middle and old age, still find savory, sighing regretfully, not for what they did but for what they left undone.

'Oh! comme je regrette le temps perdu,
Ma jambe bien faite et mon bras si dodu.'

'The forces intended for operations in the Philippine Islands left San Francisco, at various times during the months of May, June, and July, and when assembled around the city of Manila aggregated about 15,000, 13,000 of whom were volunteers and the remainder troops from the regular army. Major General Wesley Merritt was in command of these troops. Having landed at Cavite, on the island of Luzon, July 25, 1898, he found the city already invested by the troops of the United States and the insurgent forces under General Aguinaldo. The insurgents occupied a line of entrenchments on the land side of the city, our troops, under General Greene, occupying another line in their rear.

'After carefully reconnoitering the position General Merritt concluded that the attack must necessarily be made from the water side of the city. Preparations were made for the attack about the first week in August. The Spanish forces consisted of from 10,000 to 15,000 troops. Negotiations for a surrender proved fruitless, and on the 13th of August an attack in force was made.

'Waiting for low tide, the troops were deployed along the beach, and after a spirited engagement lasting for about two hours charged and captured the enemy's entrenchments and quickly reduced the city.

'The troops behaved with great gallantry and accomplished the result aimed at with comparatively little loss, the casualties aggregating 17 killed and 9 officers and 96 enlisted men wounded.'¹

Lieutenant Colonel Lippincott was Chief Surgeon of the expedi-

¹ *Dodge Commission Report*, I, 232.

tion, and the following excerpts are from his report to the Surgeon General under date of August 31:

'The total number of deaths from disease and accidents since first fleet left San Francisco is 29, distributed as follows: typhoid fever, 14; septicæmia, 1; paralysis, 1; bronchopneumonia, 1; pneumonia, 2; dysentery, 2; endocarditis, 1; appendicitis, 1; morphine poison (suicide), 1. . . . The bay of Manila is practically an open sea and we have had to land supplies and patients through the surf, contending with high winds and almost constant rains. Life has frequently been endangered and property lost or ruined. With all this the Medical Department has performed its duties cheerfully and efficiently. . . . I trust soon to be able to have the medical officers instructed in the preparation of the various reports, etc. At San Francisco there was no time for instruction, although much was done in that direction. . . .

'I found that a number of men had been enlisted for the Hospital Corps, but, perceiving that many more would be required, I recommended continued enlistments, and, in addition, the transfer of the volunteer regimental hospital corps to the regular establishment, which was ordered. . . .

'While in San Francisco I made every effort to secure ample medical and hospital supplies, and was successful to a great degree. The medical purveyor, Colonel Middleton, did everything in his power for us, and issued many articles not usually supplied for field service. Many necessary articles for the sick on the transports were furnished. Brigade supplies were put on board certain ships and everything was done that could reasonably be done to make the voyage successful.

'On the ocean I prepared a circular for the guidance of medical officers, and several typewritten copies bearing the approval of the commanding general were issued before the attack on Manila. . . .

'... I desire to say here that our department received great credit for its preparation and for the manner in which it met the many difficulties of the day. It should be stated that every

wounded man was dressed and comfortably in bed by 7 o'clock P.M. on the day of the attack. . . .

'While the volunteer surgeons lack knowledge of reports, etc., the Surgeon General may well be proud of their field and hospital work. In the matter of supplies, I must say that the field supply table is not entirely satisfactory. . . . However, I have great reason to be thankful it was not adhered to. . . .

'The Quartermaster's Department did well for us, and I have every reason to be grateful to them. . . .

'I now enclose lists of wounded,¹ an analysis of which shows that there were —

Killed:	
Officers.	0
Enlisted men.	11
Wounded:	
Officers.	12
Enlisted men.	104
Died from wounds received in action:	
Officers.	1
Enlisted men.	7'

A kind old man, Colonel Lippincott, then approaching retirement for age and not considered forceful. He even spoke kindly of the Quartermaster's Department and was thankful to it! But, somehow, he must have had a way of getting things and of getting work done, as his reports and results are not like most others of the period.

THE PORTO RICAN CAMPAIGN

The expedition to Porto Rico 'was under the immediate command of the Major General Commanding the Army, General Nelson A. Miles, and consisted for the most part of volunteer troops, with artillery and cavalry from the Regular Army, drawn from the camp at Chickamauga and other points. Some of the

¹ The discrepant statements as to the numbers of killed and wounded in this campaign are copied from official sources and are not now wholly explainable. The probabilities are that the list of killed and wounded submitted by Col. Lippincott was accurate.

troops were landed at Santiago before its surrender, and assisted in maintaining the lines around the city. . . . General Miles left Santiago on the 21st of July with about 3400 men who had not disembarked.

'The original plan of campaign involved a landing at the north-east corner of the island, near a place called Point Fajardo, and a movement thence toward San Juan. Two considerations induced General Miles to abandon the intention of landing at Point Fajardo, and to land instead at the harbor of Guanica, on the southern coast of the island. The first consideration was the fact that the intention to land at Point Fajardo had in some way been made public, and was anticipated by the Spaniards; and the second, that the intended point of disembarkation was an open roadstead, and that he had inadequate facilities for landing others.' ¹

General Miles reported that the Spaniards were surprised. So was the War Department, which had already started General Wilson and General Schwann, with 6000 officers and men, for Point Fajardo. These were somehow diverted to Ponce. General Brooke arrived later and disembarked east of Guanica. The arrival of these and other reënforcements brought the invading force to 14,365 on the date of the cessation of hostilities.

'The suspension of hostilities occurred on the 13th of August, about twenty days after the advance guard of General Miles's expedition landed on the island. In the different movements of this campaign about 6000 of our troops were under fire. There were six different actions of greater or less severity, in all of which our forces were successful.

'The total casualties of the campaign were three enlisted men killed and four officers and thirty-six enlisted men wounded.' ²

Colonel Charles R. Greenleaf accompanied General Miles as Chief Surgeon. His report to the Surgeon General states: 'Arriving at Guanica on the 25th of July, the town and harbor were occupied and the next morning a sharp engagement occurred, in

¹ *Dodge Commission Report*, I, 230.

² *Ibid.*, 231.

which we had four men wounded. The wounds were so slight that transfer to the Lampasas was not considered necessary. More transports arrived while we were at Guanica, each bringing a large detachment of typhoid cases, which were transferred to the Lampasas. The health of the troops on shore while we were at Guanica was good, although some typhoid cases developed, but later, heavy rains occurring, a large sick report speedily resulted.'

Arriving at Ponce on July 28th, he found a large and well appointed military hospital, containing forty-four sick Spanish soldiers. These were cared for. The hospital was exceedingly filthy, but it was cleaned up and used for American soldiers. As transports sailed for the North, they carried loads of sick. 'On the evening before the troops left their camp near Ponce to march against the Spaniards, the chief surgeon of the several divisions informed me that about fifty men would have to be left in the hospital, and I made the necessary arrangements, but during the night the building was invaded by a promiscuous crowd of stragglers, numbering nearly 150, not over two thirds of whom required hospital accommodation. There was no guard at the hospital and the surgeon could not control them; hence there was a good deal of confusion. I established as soon as possible a convalescent camp, under charge of the Nineteenth Infantry, to which most of these men were removed.' The hospital ship Relief put in and was loaded with 250 sick. On board was Lieutenant Colonel Nicholas Senn and he was asked to investigate the typhoid fever. He reported that he found 250 cases, all infected in the United States, most of them at Chickamauga.

A general hospital was planned and tents for it were sent on the Concho, but they were under the rest of the cargo and could not be reached for seven or eight days, which caused embarrassment. Malaria and intestinal troubles increased rapidly. There were sufficient supplies and these were supplemented by gifts from the Red Cross and the National Relief Association of Pennsylvania. There were Red Cross nurses with the expedition from the start, but while he praised their services, Colonel Greenleaf did not pine

for more, as on August 10th, 15th, and later he requested details of men from the line to nurse the sick, and on August 12th he cabled to the Surgeon General, in response to an inquiry as to how many nurses he needed, 'Prefer less number male nurses to any female nurses.'

It was an ironical turn of fortune that sent those two ambitious and high ranking men, General Miles and Colonel Greenleaf, with the least important expedition of the war. Secretary Alger states:¹ 'The appointment of Major General Shafter to command in what proved to be the greatest expedition and land battles of the war was made upon the recommendation of the major general commanding the army, and at his request.'

'General Miles had been explicitly informed by the President, as well as by myself, before he went to Tampa, that he was at liberty to go in command of the Santiago expedition, or to organize the force for the invasion of Porto Rico.' Presumably Colonel Greenleaf, the 'Chief Surgeon, Armies in the Field,' also had his choice. That they guessed wrongly was doubtless a great disappointment to them and their numerous admirers and friends.

HOSPITAL SHIPS

Three hospital ships were put into use during the war, at first carrying medical supplies to troops in Cuba and Porto Rico and there taking aboard loads of sick. They were the Relief and the Missouri, which were permanently equipped for the purpose, and the Olivette, a water-boat for the transport fleet of the Santiago expedition, which was temporarily made a hospital ship by being outfitted with the equipment of a field hospital.

The Relief had been the John Englis, a Long Island Sound passenger steamer. She was purchased on May 18th and was satisfactorily converted in time to sail for Cuba on July 2d. She subsequently did good service in the Philippines.

The Missouri was a cattle boat obtained in July. The Surgeon

¹ *The Spanish-American War*, 35 and 69.

General supposed that she could be converted in ten days and was not complimentary when she did not sail before August 23d.

Learn a small portion of the facts from Colonel Arthur, who was detailed to convert, equip, and command her:

'When this ship was finally accepted it was en route from London to Philadelphia, where it arrived about the middle of July. Before its arrival I had secured plans of the ship and had gone over them and calculated as well as I could the space available for the wards, laboratories, operating room, etc., etc., and had made out requisitions for medical supplies and had them ready to put aboard. . . .

'The ship was used only for carrying freight and cattle, had no living accommodations at all except for the small crew. . . . The plumbing consisted of a hole in the floor of the deck through which sea water, dipped up in a bucket, was poured into the captain's bath tub below through a funnel. There were six old-fashioned hopper closets scattered about the ship, flushed by pouring buckets of salt water into them. Bathing, if any, was accomplished with the fire hose on deck. . . .

'The idea seemed to prevail that to make a hospital ship out of a liner it would be necessary only to put patients where passengers had been carried and go to sea.

'Here are a few of the things that had to be done and all of it in as short a time as possible, to fit this ship to carry 326 patients (that was the capacity) H.C. detachment (including twenty male trained nurses of whom more later) of 100 men; seven medical officers, a quartermaster and commissary officer and his office force, nine ship's officers, a crew of thirty-eight men. Altogether the ship was to carry about 500 people.

'1. The main deck cleared for wards, roofed over and sheathed, closed in with weather-proof sides with many windows: the two winches raised to the upper newly built deck level and secured. Hatch-coamings cut to the main deck level. These were 2 inches high $\frac{1}{2}$ inch steel and surrounded all four hatches, two forward,

two aft, all ten feet square. Acetylene torches were not in use in 1898 and these coamings had to be cut by hand with hammers and cold chisels.

'2. An entirely new deck constructed forward and aft of the fiddle on a lower level than the 'tween decks for stewards and H.C. quarters — storerooms for medical, quartermaster, commissary, and ship's stores and other purposes. This was called the orlop deck.

'3. A complete system of plumbing installed with shower baths — water closets, wash basins, etc., for 500 people. Extra fresh water tanks were also necessary.

'4. Electric installation — a large dynamo and engine, worked by steam from the main boilers — with light and power in all parts of the ship, requiring many miles of wiring.

'5. A complete ventilating system with two large Sturtevant fans on the upper deck, one forward and one aft, with ducts to all parts of the ship.

'6. A complete refrigerating plant with cold rooms for meat, vegetables, etc.

'7. A steam laundry complete.

'8. Operating room, laboratories, X-ray room with all the necessary fittings.

'9. Complete overhauling, enlarging and renovating of the forecastle.

'10. Cooking facilities, a new and much enlarged galley and electric cookers in the main wards.

'11. Steam launches (two) and twelve extra lifeboats.

'12. Wards filled with two-tier bunks — 460 in all — for patients, H.C. men, stewards, etc., etc.

'13. Storerooms for medical, quartermaster, commissary, and ship's stores and for patients' effects and H.C. equipment built in and fitted with shelving hooks, etc., etc.

'(I decided to provide a full field equipment for every man of the H.C. detachment, but to keep them all in a storeroom to be issued to the men only when detached for duty ashore.)

'14. A carbonating apparatus was installed — near the laundry.

'15. Captain's quarters built on the bridge. There were many other things to be done but these were some of the principal alterations necessary. Of course the engines had to be overhauled and an extra steam boiler was put in later on to supply the auxiliary machinery without drawing on the main boilers and reducing the speed of the ship. This part of the work was left to the chief engineer and his gang. . . .

'When work started in the ship I made every effort to secure the help of a naval architect or experienced shipbuilder, but none was available. . . .

' . . . A great deal of the work was done at the expense of a "Red Cross Auxiliary No. 2" — a number of New York business men who took an entirely unsolicited but real and intelligent interest in the ship. They told me: "Order for the ship anything you want; O.K. the bills and send them to us and we'll pay them." . . .

'At one stage of the refitting I told the Depot Quartermaster that I would need 230 two-tier bunks. He said he'd advertise for bids for thirty days and award the contract to the lowest bidder. Thirty days! I was being besieged daily with messages from the S.G.O. "When do you sail?" "Why this delay?" etc., etc. I found out who had furnished beds for the Relief — ordered them by telegraph on my own responsibility — hoping somebody would pay for them. . . .

'The summer of 1898 at Pier 22, Brooklyn, was very hot, but the work kept up night and day. About 1200 workmen (all that could be crowded in) of different kinds (carpenters, painters, plumbers, electricians — structural iron workers, riveters and others) were at work, 800 by day and 400 at night — approximately. . . .

'Captain Luckhurst looked very grave when I showed him my orders: "It's not safe, Major, but I'll do my best," was all he said — and the work was pushed harder than ever — day and

night and all day Sunday, the sailing put off till late Monday night and gangs of ship carpenters, plumbers, painters, electricians, etc., etc. engaged to go with us and keep on working at sea. . . .

'Captain Luckhurst told me that at the first sign of "dirty weather" he would make for the nearest port on the coast, as the ship could not weather a real gale. . . .

'One of the patients from Siboney, a contract doctor, told me that Major Gorgas, Medical Corps, was sick then, though he was up and about, and that he (this doctor) thought he had typhoid fever. We were soon to start, so I sent Captain Stark to headquarters to ask for an order for Major Gorgas to go home with us. He came down later — looking very ill; I put him in my bunk — took him home — and sent him, on arrival in New York, to the Presbyterian Hospital — where he was very ill for six weeks (typhoid fever) but finally made a good recovery. He insisted afterwards that he would certainly have died if he had been left at Siboney. I think he probably would not have pulled through there for the conditions in that camp were not favorable for recovery from serious illness.

' . . . As mentioned before, thirteen died and were buried with such military honors as we could manage. The bodies were put in coffins, through which were bored large auger holes, were weighted with pig iron, put on a hinged stop, just forward of the bridge, on the port side, covered with flags. The ship's engines would stop, the captain read the burial service, the coffins dropped into the sea, the bugler sounding taps, all the men not on duty standing attention. One day we buried four at a time.

' . . . Three newspaper reporters from the "New York Journal" came up the gangway. It was proposed to keep them off the ship, but I asked them into my cabin, gave them whisky and cigars — and asked them to make allowances for our strenuous trip and the hard work my people had had to do and then showed them all over the ship. Next day appeared in the "Journal" an article — headed by a cut of a ship in no way resembling the Missouri —

with the announcement in large letters, "One ship that is not a disgrace," and a very flattering article, a small fraction of which was in accordance with the facts.'

In considering the tragic or ridiculous features of the Spanish-American War, it is important that we keep in mind a few fundamental facts when indulging the natural tendency to make comparisons with our showing in the World War. In 1898 our people knew war only by the standards of the Civil War. A belief universally impressed by the Civil War was that it was prolonged by failure to strike early and hard. Lincoln's first call for 75,000 short-time volunteers and McClellan's later dilatory tactics were generally looked upon as mistakes. The strategy (if the word be permissible) of the Spanish-American War lay in the quick blow. It succeeded. War was declared in April and hostilities ended in August. We entered the World War in April, sent the first draft regiments to camps at the end of August and the first of them into battle a year later, and we fought with airplanes, artillery and tanks obtained from our allies. General Hagood tells us that the General Staff system then existing was such a failure that it had to be reorganized completely after we entered the war. While we avoided large typhoid epidemics in the World War, we did not avoid measles, influenza and pneumonia, and it is possible that, in later years, we may appear to have been almost as unprepared and as ignorant in regard to respiratory diseases as the country now seems to have been in regard to intestinal diseases in 1898.

CHAPTER VIII

RESULTS

As this is a narrative of the Medical Department's history, no space will be taken to discuss the much-disputed benefits accruing to the nation at large from the acquisition of overseas possessions, from a broadened Monroe Doctrine, a Cuban government in trust, a Japanese bogey, participation in world politics, and a doubt that 'In God we trust' constituted a sufficient national defense. These things came, and each was regarded as a blessing or as a misfortune by various portions of our people, and such is still the case to a less extent. That the Army and the Medical Department benefited is beyond question. Both received rude jolts from the war, but both were awakened, and the country was awakened to both. The Dodge Commission did not content itself with pointing out faults. Its criticism was constructive, and its recommendations as to the Medical Department became what Colonel Jefferson R. Kean so happily designated the Department's 'Charter.' No longer were its legitimate needs to be regarded as the mere personal desires of fussy men. They were a part of the Army's and the Nation's needs, and responsibility for their fulfilment passed to the War Department and to Congress. Fulfilment was years in coming, but improvement began at once. First in order of coming was

THE NURSE CORPS (FEMALE)

This Corps was first organized without specific authorization by law, but under the general power of the Executive to organize and command the army and to meet emergencies. The Surgeon General related the early history of the Nurse Corps in his annual report for 1899, as follows:

CONTRACT NURSES

'The value of the services of female nurses has been recognized in a practical way by most military nations since the time of the

Crimean War, when Miss Florence Nightingale and her corps of patriotic women aided in caring for the sick and wounded in the hospitals at Scutari. In the armies of Europe provision is made for the assignment of a certain number of trained female nurses, or sisters of religious orders, at large permanent military hospitals; and since the Geneva convention the nurses furnished by the National Red Cross and other aid societies have served in time of war in hospitals at the base of military operations.

‘During our civil war female nurses, many of them Sisters of Charity, served at many of the large general hospitals. A few who had special ability, intelligence, and experience were employed in nursing particular cases; but male help was preferred in the general wards, and the sphere of the women was usually restricted to the extra diets and supervision over the linen, the laundry, and the contribution room.

‘Since then, however, the systematically educated and trained female nurse has been developed by the medical profession to insure expert attendance on the patient during the absence of the physician or surgeon. There is a large number of such educated women in the United States at the present time, and they did not hesitate to offer their services to the Government during the recent war.

‘The emergency which rendered their services acceptable was the product of two causes: First, the inability of the Medical Department of the Army to enlist in a few weeks 6000 or more men qualified by previous experience to perform certain important duties, or indeed to enlist that number of inexperienced but intelligent men, with the intention of training them subsequently. Second, the epidemic prevalence of typhoid fever in our camps.

‘When war was declared April 21, 1898, there were in service in the Hospital Corps 791 non-commissioned officers and privates, all well disciplined and proficient. These barely sufficed for the medical service of the Regular Army, then on its peace footing, with a strength of about 28,000. Suddenly authority was given to increase the Army to ten times this number. Patriotism

speedily filled the ranks of the companies, and regiment after regiment was mustered into service, but no energy on the part of the Medical Department could raise a corresponding number of trained men for the Hospital Corps. To help this office out of its difficult position authority was given to transfer men from the line for hospital duty, but as I explained in my last annual report (page 121) soldiers of volunteer regiments did not care to sever their local connections for service in the Hospital Corps of the Regular Army, and the officers of these regiments were naturally disinclined to transfer their best and most intelligent men to another command. However, by enlistment and transfer from the line a large number of men was hastily added to the Hospital Corps. Most of them were untrained in hospital work and many were unfitted for duties of this character. About this time the infection of typhoid fever spread throughout our camps and filled the field division hospitals with men seriously sick. These hospitals had been organized as mobile establishments to follow the troops from camp to camp and from battlefield to battlefield during the progress of a campaign, but this sudden prevalence of a dangerous and protracted fever immobilized them. The medical officers in charge had to cease their preparations for active service and devote the whole of their energies to the care of the sick. In doing this their hospitals ceased to be field division hospitals in all except in name. They became expanded and equipped without regard to mobility or campaigning.

‘Trained nurses were required to care for the large number of sick in these hospitals. The Hospital Corps had in its membership many men whose services were invaluable at this time, but there was not a sufficient number of such men for the occasion.

‘I had already as early as May 10 made contracts with female nurses for service in general hospitals, and in July many were on duty in the hospitals of General Shafter’s army at Santiago de Cuba.¹ During the prevalence of typhoid fever in our camps I

¹ The Surgeon General may have given himself a bit too much credit for foresight in establishing the Nurse Corps, as in a letter to Dr. Anita Newcomb

increased the number of female nurses and placed them on duty, not only in the general hospitals, but in the division and post hospitals and in such regimental hospitals as required their services. The number reached a maximum of 1158 on September 15. After this date the suppression of the typhoid epidemic and the muster out of volunteer regiments rendered so large a nursing force unnecessary. Contracts were annulled and on July 1, 1899, there remained in service only 202 — 65 in the United States, 76 in Cuba, 9 in Porto Rico, 38 in Philippines, 6 in Honolulu, and 8 on the hospital ship Relief. The total number of female nurses with whom contracts were made was 1563. Among them there were reported 140 cases of typhoid fever; 12 fatal. One nurse died of yellow fever.

'American women may well feel proud of the record made by these nurses in 1898-99, for every medical officer with whom they served has testified to their intelligence and skill, their earnestness, devotion, and self-sacrifice.

'The contract nurses now in service have been organized into a female nurse corps under the superintendence of Acting Assistant Surgeon Anita Newcomb McGee. The corps consists of chief nurses, nurses, and reserve nurses.' ¹

McGee, dated April 28, 1898, he said: 'In case we have a number of general hospitals established, I expect to depend principally upon our trained men of the Hospital Corps for service as nurses in the wards. I should, however, be glad to avail myself of the services of a certain number of trained female nurses for the care of special cases, and for the preparation and distribution of special diet in the hospital wards. I appreciate very highly the offer of the national board of management of the Daughters of the American Revolution, and am quite willing to turn this whole matter over to your committee, giving you the applications now on hand and those which may hereafter be received, and allowing you to select proper persons for the service required in case I have occasion to call for the assistance of trained female nurses.

'In this case I would expect you to answer all letters of inquiry and to keep a list of eligibles from which to make your selections in case of a call from me.' (*Second Report*, 50, National Society of the D.A.R. Washington, 1900.)

Thereafter the Daughters of the American Revolution procured, examined and furnished the nurses as called for, very much as did the Red Cross Society during the World War.

¹ *Surgeon General's Report*, 1899, pages 23-25.

As has been intimated, not all medical officers viewed the innovation with early enthusiasm, but suffering and adversity proved exacting teachers, help from any source became so necessary and the help given by the women nurses was of so high an order, so efficient and satisfactory, so disarming of wrath and criticism, that open opposition was quickly silenced, and more open admiration took its place.¹

This is not to say that all nurses at all times gave complete satisfaction. To say that would be the sort of sentimentalism that designates them 'angels of mercy.' Happily, they are very human sisters, with tempers, weaknesses, and obstinacies at times, but usually sensible, sound, educated and capable, willing to work reasonably, and knowing their jobs. For a full generation the Medical Corps has been proud of them, has extended their use and has only regretted that there are not more of them. The Corps received statutory recognition as part of the Medical Department by the act approved February 2, 1901. An act of July 9, 1918, provided 'that the Nurse Corps (female) of the Medical

¹ Lieutenant Colonel A. C. Girard, Chief Surgeon of the Second Army Corps, in March, 1899, unburdened his soul about them as follows: 'During the days of Camp Alger, Miss Barton offered the commanding general female nurses for work in the division hospitals. I refused this assistance, partly because I was then under the belief that we were preparing for active service, and female nurses would be too much of an impediment in operation in the field. I was then not very much impressed with the advantages of nursing of this character, as I had never had any experience with it: I learned better when I compared the work of the female nurses in the Red Cross hospital at Meade with that of the men of the hospital corps in the division hospitals. At that time the advantages of female nurses became more generally recognized throughout the Army; and when the Surgeon General informed me that female nurses could be employed in Southern hospitals I availed myself, however to a limited extent, of this opportunity, and used the nurses more as instructors and superintendents of wards than was done in most army hospitals at that time. There was still an expectation of active service, and as the hospital corps had been recruited up to the full allowance, I deemed it of greater importance to have them benefited by the training of these nurses than to do simply the menial work, while the nurses attended to the sick. I therefore did not deem more than ten or twelve female nurses desirable for each division hospital, and found that the number was sufficient.

'As a rule their behavior was satisfactory and their work commendable, but they were an expensive luxury, as they received more wages than the men of the hospital corps, and required much waiting on.'

Department of the Army shall hereafter be known as the Army Nurse Corps.' Although, for reasons unknown to mere man, the elimination of the word (female) was ardently desired by some of the nurses, they retained their femininity, and the Corps contains as fine women as ever.

The act of June 4, 1920, gave them 'relative rank as follows: The superintendent shall have the relative rank of major; the assistant superintendent, director and assistant directors, the relative rank of captain; chief nurses the relative rank of first lieutenant; head nurses and nurses, the relative rank of second lieutenant; and as regards medical and sanitary matters and all other work within the line of their professional duties shall have authority in and about military hospitals next after the officers of the Medical Department.' Better still, the pay readjustment act of 1922 increased their pay.

An act of May 13, 1926, permits retirement of nurses after thirty years of service or after twenty years if the nurse has reached the age of fifty. Retired pay is based upon length of service and service in various grades. (Par. 24, A.R. 40-20.)

THE DENTAL CORPS

The Dental Corps did not legally exist until February 2, 1901, when Congress enacted that 'The Surgeon General of the Army, with the approval of the Secretary of War, be, and he is hereby, authorized to employ dental surgeons to serve the officers and enlisted men of the Regular and Volunteer Army, in the proportion of not to exceed one for every 1000 of said Army, and not to exceed thirty in all. Said dental surgeons shall be employed as contract dental surgeons under the terms and conditions applicable to army contract surgeons.' But it had a beginning in the Spanish-American War, in the Seventh Army Corps at Jacksonville, Florida. The following account of that beginning is taken from the report of Lieutenant Colonel Louis M. Maus, Chief Surgeon, Seventh Army Corps:

'Department of Dentistry. On account of the large number of men belonging to the corps, who suffered from toothache, bad teeth, and other troubles of the mouth, I determined to organize a department of dentistry. I had learned previously that quite a number of the members of the hospital corps were dentists as well as physicians. Hospital Steward J. W. Horner, U.S.A., was assigned to the duties of corps dentist and Acting Hospital Steward Watts was detailed as his assistant. Suitable rooms were hired by the Quartermaster Department for offices in each of the cities where the corps was serving. Dr. Horner equipped the offices, etc., and agreed to do the work gratuitously, only making a nominal charge for material used, which, as a rule, amounted to very little. After the establishment of his office, the following circular, dated September 30, 1898, was issued by the corps commander:

““Dr. J. W. Horner, Corps dentist, has established himself in his office on the corner of Forsyth and Main street, and in the Hubbard Building, and is now ready to attend to the teeth of any member of the Seventh Army Corps. Dr. Horner is to do all of the dental work for members of the corps free of cost, except for material furnished.

““Regimental commanders will cause this circular to be published by their company commanders to companies.”

‘It was almost impossible to realize the great benefit which resulted to the troops from this department, located as they were in the field. Engagements were made as in civil life, and both dentists were kept busy from early morning to late into night. I was informed by the dentist that he was unable to attend to half the calls that were made on him. In my opinion every corps should be provided with a dental department consisting of one chief dentist with the rank of major, three dentists with the rank of captain, and three assistant dentists with the rank of first lieutenant.’^{*}

^{*} Incidentally it may be mentioned that Colonel Maus established a general operating hospital for the corps, with Major George R. Fowler, a distinguished

Popularly regarded at the time of the Spanish-American War as a mechanical trade rather than a learned profession, dentistry has since undergone a great development. Its educational standards have been raised and broadened, it has attracted many fine men and ardent investigators and with increased knowledge of the relation of diseases of the mouth and teeth to the other diseases of the body the dentist is gladly sought in consultation by the general medical practitioner, the surgeon and most of the numerous specialists in medicine. No longer does he merely extract, fill, and make substitutes for teeth. He is a specialist on the diseases of the mouth, frequently a specialist in surgery of the mouth and face. The Medical Department needs him and is grateful in its hope of further benefits to come from his skill.

On March 3, 1911, the President approved an act which 'attached to the Medical Department a dental corps, which shall be composed of dental surgeons and acting dental surgeons, the total number of which shall not exceed the proportion of one to each thousand of actual enlisted strength of the Army; the number of dental surgeons shall not exceed sixty, and the number of acting dental surgeons shall be such as may, from time to time, be authorized by law. All original appointments to the dental corps shall be as acting dental surgeons, who shall have the same official status, pay and allowances as the contract dental surgeons now authorized by law. Acting dental surgeons who have served three years in a manner satisfactory to the Secretary of War shall be eligible for appointment as dental surgeons, and, after passing in a satisfactory manner an examination which may be prescribed by the Secretary of War, may be commissioned with the rank of first lieutenant in the dental corps. . . . The pay and allowances of dental surgeons shall be those of first lieutenants, including the right to retirement on account of age or disability, as in the case of other officers: provided, that the time served by dental surgeons

volunteer surgeon, in charge, that he appointed a corps oculist and a corps aurist and he recommended the employment of a corps veterinarian and an assistant.

as acting dental or contract dental surgeons shall be reckoned in computing the increased service pay of such as are commissioned under this act. . . .'

The National Defense Act of June 3, 1916, provided that 'Dental Surgeons shall have the rank, pay and allowances of first lieutenants until they have completed eight years' service. Dental surgeons of more than eight but less than twenty-four years' service shall, subject to such examination as the President may prescribe, have the rank, pay and allowances of captains. Dental surgeons of more than twenty-four years' service shall, subject to such examination as the President may prescribe, have the rank, pay and allowances of major: Provided, that the total number of dental surgeons with rank, pay and allowances of major shall not at any time exceed fifteen.'

On October 6, 1917, the President approved an act which gave to the Dental Corps the same grades and same proportions in grades as 'are now or may be hereafter provided by law for the Medical Corps,' the same rank, pay, promotions and allowances, including the right of retirement. The allowance remained one dental officer for every thousand of the total strength of the Regular Army from time to time.

HOSPITAL CORPS

The Hospital Corps did very creditably in the war, considering that it was composed almost entirely of recruits. The small group of men constituting it before the war were too few to be able to do the work and the corps had to be increased in time of war and great epidemics, when there was little or no time to give the new men the large amount of instruction and training which their numerous and specialized duties required.

On June 2d, Congress authorized an increase of the hospital stewards from 100 to 200. General Sternberg says: 'There was, however, no provision made for Hospital Corps men for the volunteer troops except that which empowered the Secretary of War (act March 1, 1897) to enlist as many privates of the Hospital

Corps as the service may require.' It is not known what more could have been desired. With that authority and in view of the Surgeon General's requests, any shortage in the Hospital Corps was clearly up to the War Department, in the early stages of the War. Later, after the development of the epidemics, it was difficult to get men. General Orders No. 58, A.G.O., May 31, authorized transfers of men from volunteer organizations to the Hospital Corps. The number of men enlisted and transferred was approximately 6000, less than three per cent of the enlisted strength of the army, an insufficient number.

Fortunately, the employment of women nurses put over these inexperienced men a skilled personnel capable of instructing them in their nursing work. Their field work was mainly hard physical labor, which they performed loyally. Many of the men so hastily enlisted or transferred in 1898 remained in the Corps, received training and instruction, and formed the backbone of the organization during the field service of the Filipino insurrection, doing work which women could not do. From that time to the present the Hospital Corps has gradually become more and more a field organization. The men still do the nursing in small post hospitals, and many are necessary as pharmacists, technicians, clerks, attendants, watchmen, drivers, cooks and in other positions in general hospitals, but the field organization, with its medical regiments and much larger detachments with combat regiments has shown a growth which tends to make the duties predominantly those of field soldiers.

RED CROSS ASSOCIATION

The Red Cross Society played a relatively small part in the Spanish-American War, as it had not the size, wealth, organization, or legal status which it later acquired and which enabled it to play a larger part in the World War. Nevertheless, it rendered valuable service and laid the foundation for its later popularity and growth.

In 1898, Surgeon General Sternberg reported 'others [nurses]

were obtained through the kind assistance of the Red Cross Society for the Maintenance of Trained Nurses, Auxiliary No. 3, and I desire to express my high appreciation of the valuable services rendered to the Medical Department by this organization.' On June 9th he sent to all chief surgeons the following letter:

'The Secretary of War has approved of the following proposition made by the American National Red Cross Association, and the chief surgeons of army corps and divisions will coöperate with the authorized agents of this association for the purposes indicated.

'We can put any desired amount of hospital supplies — ice, malted milk, condensed milk, Mellen's food, etc. — into any of the volunteer camps in a few hours. Will you be kind enough to bring this letter to the attention of Secretary Alger and ask him if there is any objection to our appointing a Red Cross representative to report to the commanding officer and the chief surgeons in every camp, confer with them as to their immediate needs, and if anything of any kind is wanting, open there a Red Cross station and send in the supplies. We can do this, not in a few weeks or a few days, but in a few hours, and can furnish any quantity of any desired luxury or delicacy for hospital use. We hereby tender our aid and put our organization at the War Department's service for coöperation in this field.

'In accordance with their promise the American National Red Cross Association has had agents in all of our principal camps and has contributed supplies of various kinds in a most liberal manner for the use of our field hospitals. The value of the assistance rendered by them has been highly appreciated by medical officers generally. Other organizations which have rendered very valuable services are the National Relief Commission, having its headquarters in Philadelphia, and the Massachusetts Volunteer Aid Association, with headquarters in Boston. Both of these organizations fitted out hospital ships, which were placed at my service for the transportation of our sick from Porto Rico, and I

take pleasure in testifying to the valuable services rendered by the yacht May, of the National Relief Commission, and the hospital ship Bay State, of the Massachusetts Volunteer Aid Association.' ¹

The Surgeon General was also given, by various individuals, sums of money aggregating \$24,244.94, which he sent principally to general hospitals, to chief surgeons, and to hospital ships.

GENERAL HOSPITALS

The service had not previously had general hospitals in time of peace, except the Army and Navy General Hospital at Hot Springs, and for the short periods necessary to get rid of the large accumulations of sick and wounded from wars, periods made as brief as possible by the use of discharges, furloughs and transfers to post hospitals.

The Spanish-American War proper was followed immediately by the occupation of Cuba, Porto Rico, the Philippines, and Hawaii, so that the Army could not be reduced to its pre-war strength and it was continually necessary for men to be detached from their organizations and sent to general hospitals, where they could get the better treatment which could be obtained where specialists, experts and large special equipments had been concentrated. Such had been the advances in medicine that the lone doctor in a one-company post, equipped with a small medical chest, could no longer give as good care to all sorts of cases as could be given elsewhere. Such was the trend of medical practice in civil life also. Hospitals were increasing in numbers and size, specialists and specialties multiplying and the general practitioner, the man who did all kinds of work and represented the sum total of medical assistance for his patients, and who did it with a small portable equipment, was passing.

So it was necessity, not mere preference, which continued general hospitals after the Spanish War. More and more grew the practice of transferring to them the sick, not only soldiers but also

¹ *Surgeon General's Report*, 1899.

the members of families of officers and enlisted men, who could not be given the best of needed care at their homes and stations. For many years Congress had made it a part of the medical officer's duties to treat the families of officers and soldiers when practicable, and medical officers had cheerfully and almost universally acted upon the interpretation that 'when practicable' meant when possible. So, by a natural transition, although without specific authority, general hospitals became available for these dependents and the service for women and children is now important in all of them.

A number of general hospitals were established during the war and in them, after they had once become properly organized, was done excellent work. Several of them were closed when the disbandment of the volunteer army removed the necessity for their existence, but four or five remained, and to this day are splendid institutions, in which professional work of the highest order is carried on. Others have been established and there are now seven — eight if the station hospital at Fort Sam Houston be considered a general hospital, as it is in its work.

The general hospital at the Presidio, San Francisco, was later named the Letterman General Hospital, in honor of Jonathan Letterman. It is the hospital for reception and definitive treatment of the more serious cases of the army stationed on the Pacific Coast and nearer states and for the sick returned from trans-Pacific stations. It has 1000 beds, abundant medical, dental, nursing, and enlisted personnel, is beautifully situated and well arranged.

The original Division Hospital at Manila, later named Sternberg General Hospital, has long been the Army's largest and best hospital in the Philippines. It has 300 beds, and does work of the same high grade as is done in the other general hospitals.

Tripler General Hospital at Honolulu performs the same functions for the Department of Hawaii. It has 300 beds.

The general hospital for tuberculosis, originally established at Fort Bayard, New Mexico, to care for the large numbers of cases

of tuberculosis occurring in the enlarged army of the Spanish War, was transferred to and enlarged at Denver, after the World War, and was named Fitzsimons General Hospital in honor of First Lieutenant William T. Fitzsimons, Medical Corps, the first American officer killed in the World War. It has 1048 beds and is excelled by no tuberculosis hospital in the country. It was in this institution, at Fort Bayard, that Colonel George E. Bushnell achieved his great and deserved reputation as an authority on tuberculosis.

The general hospital established at Washington Barracks during the Spanish-American War, was later transferred to its own buildings and grounds at Takoma Park, D.C., became Walter Reed General Hospital and served as the nucleus of the splendid Army Medical Center which was dreamed by Lieutenant Colonel William C. Borden and is now approaching complete realization. It has 1000 beds.

Beaumont General Hospital at El Paso, opened in 1921, is the newest and has 1000 beds.

The station hospital at Fort Sam Houston has 600 beds. It is practically a general hospital.

The Army and Navy General Hospital at Hot Springs, Arkansas, is the oldest but smallest. Its normal bed capacity is but 169, but, by use of emergency expansion, it is at the time of this writing caring for 222 patients.

Thus the Army has almost 5000 beds in hospitals equipped and staffed to give as careful, thorough, and efficient treatment as may be had anywhere, and the Army's personnel gets, without cost to itself, as careful and thorough treatment as can be commanded by the country's wealthiest people. It is an interesting fact that services obtained without effort or cost to the individual are sometimes not appreciated, and such is occasionally true of the services rendered in these hospitals, but it is nevertheless true that they are not often excelled by the very best hospitals in the country. And it is generally true that the Army people are appreciative of what is done for them.

MEDICAL CORPS

The Medical Corps regained the fifteen numbers of which it had been deprived in 1894, but more important, it gained an experience in camp and field service such as it had had no opportunity to see since the Civil War. It paid for its experience. At one time fifteen per cent of its members were sick. In the Santiago expedition, but one medical officer, Captain Ireland, now the Surgeon General, remained well during the entire campaign. An attack of malaria the following winter showed that even he had not escaped infection.

The Corps entered the war a corps in name only, in reality an aggregation of post surgeons. It came out enriched by its experiences and contacts, a band of soldiers and brothers knowing one another, fellow sufferers and fellow workers.

Despite its troubles and its failures, most of which it was wholly powerless to prevent, it came out of the war better known and more highly esteemed by the public and the Army than before, with a larger share of sympathy and support from both of these, because its problems were better understood and the disadvantages under which it had worked more fully appreciated.

It was in step with modern medicine and modern thought. Weir Mitchell once wrote that 'the true rate of advance in medicine is not to be tested by the work of single men, but by the practical capacity of the mass.' The mass of the Medical Corps, at the end of the Spanish-American War, was applying as routine the teachings of the greatest men of the closing century, of Virchow, Pasteur, Koch, Lister, Behring. It could be judged not only on the achievements of Sternberg, but also on those of hundreds of obscure doctors in palm-leaf huts in the tropics.

In July, 1898, Ross published his proof of the transmission of malaria by anopheline mosquitoes. In August that knowledge was being applied in the Philippines.

THE UNIFORM

The Army blue, after a long and honorable career on the battle-fields of a century and a quarter, passed from them, replaced by the mud colored khaki of various shades. The blue was retained for garrison use and full dress for several years longer, but khaki began to displace it in the tropics during the Spanish War, and eventually the olive-drab woolen uniform became the standard for all purposes. The sentimental still yearn for a return of the old blue and it is coming back. Meanwhile more men have worn the olive-drab than wore the blue in all earlier wars prior to its adoption. It has traditions of its own, and is almost as popular for uniforms of policemen, constabulary, bell boys, and doormen as the blue was years ago.

‘Pride in their port, defiance in their eye,
I see the lords of human kind pass by.’

STATISTICS

The following statistics of the war are interesting, even if dolorous. They were published in the Surgeon General's report for 1900.

‘During the year 1898, 217,072 cases of disease and injury were reported by our medical officers serving with volunteer troops. This is equivalent to 2145.83 admissions to sick report during the year for every thousand men present in the command, or a little over two entries on sick report per man. Of this admission rate 2037.20 were caused by disease and only 108.63 by injuries. Malarial fevers and diarrheal diseases constituted a little over one half of the admissions, the rate for the former having been 573.56 and for the latter 453.10. The entries for typhoid fever numbered 16,796, equivalent to an admission rate of 166.03 per thousand men during the year. The rate for yellow fever was 5.58 per thousand; for measles, 61.46, and for smallpox a total of 73 cases gave a rate of only 0.72 per thousand men.

‘Of the 10,989 injuries reported, one tenth were considered due

to exhaustion from exposure and fatigue. It is an interesting fact that more men were ruptured than injured by gunshot. The former numbered 795, the latter 600, giving rates, respectively, of 7.86 and 5.93 per thousand of strength.

'In the Regular Army in 1898 the admission rate, 2146.94 per thousand of strength, was the same as in the Volunteer Army, but the ratios of the causes of admission were not identical. Disease caused a rate of 1937.71, and injury 209.23. On account of the service of so large a proportion of the regular troops in Cuba, malarial infection was the cause of nearly one third of the whole number taken on the sick reports, the admission rate for these diseases having been 694.64 cases for every thousand men of the strength. Diarrheal diseases constituted one-seventh of the cases admitted. The entries for typhoid fever numbered 4130, equal to 88.56 per thousand men. The rate for yellow fever was 12.95, for measles 25.09, and for smallpox 0.40.

'Of 9758 injuries, only 308 were reported due to exhaustion from exposure and fatigue; 1457 were gunshot wounds, giving a rate of 31.24 per thousand men, and 255 were cases of hernia, equaling a rate of 5.47.

'The total number of discharges for disability in the Volunteer Army was 1506, equal to an annual rate of 14.89 per thousand men. The rate for disease was 12.60; for injury 2.28. The largest individual rates were for venereal cases, 1.51; for consumption, 1.17; for hernia, 1.13, and for rheumatism, 1.11.

'The rate of discharge for disability among the regular troops was 11.58 per thousand men — for disease, 7.40; for injury, 4.18. Hernia occasioned a discharge rate of 1.22; rheumatism, 1.05; consumption, 1.01, and venereal diseases only 0.02.

'The total number of deaths among volunteers admitted to sick report in 1898 was 2851, equal to an annual rate of 28.18 per thousand men. Of these deaths 2664, or 26.33 per thousand men, were due to disease, and 187, or 1.85 per thousand men, to injuries. Typhoid fever caused the largest number of deaths, 1738, equivalent to 17.18 deaths per thousand men. Gunshot

wounds occasioned 1.17; malarial fevers, 1.96; diarrheal diseases, 1.29; yellow fever, 0.73; and injuries other than gunshot, 0.68, leaving 5.17 for distribution among all other causes of fatality to make up the total death rate of 28.18 per thousand men during the year.

'With the statements made in the last paragraph the following concerning the regular troops in 1898 may be compared:

'The total number of deaths was 1285, equal to a rate of 27.55 per thousand men. The death rate from disease was 22; from injury, 5.55. The largest individual item in the death rate was 9.74 deaths from typhoid fever in every thousand men. Gunshot wounds occasioned a death rate of 3.94; malarial fevers, 3.24; diarrheal diseases, 2.14; yellow fever, 1.50, and injuries other than gunshot, 1.61, leaving 5.38 for distribution among all other causes of fatality to make up the total death rate of 27.55 per thousand of men for the year.

'In the year 1897, a year of peace, the death rate from all causes was 5.11, and the average annual rate for the previous decade was 6.99. The contrast here requires no comment.

'In 1898, the volunteer troops serving in the Philippine Islands had the lowest admission rate, 1832.10 per thousand of strength; those serving in Cuba the highest, 4070.34, while the rate in Porto Rico, 2175.92, did not differ much from that of the troops in the United States, 2071.65. The high rate in Cuba was due to the excessive prevalence of malarial fevers, the rate for which alone amounted to 2555.02, and yellow fever added 121.72 to the rate; but the admission rates for most other diseases were either not in excess or were actually lower than those of the Volunteer Army as a whole. Thus the rate for diarrheal diseases was 372 as compared with 453.10 among the volunteers generally, and that for the diseases of the respiratory organs was 43.88 as compared with 134.02. The volunteers in Cuba had also the highest death rate, equivalent to 86 per thousand of strength, the rate for disease being 73.65 and for injury 12.35, gunshot wounds having contributed 11.91 of the 12.35. The fatal diseases were typhoid

fever, which caused a death rate of 22.05 per thousand men; yellow fever, which occasioned a rate of 15.88; malarial fevers, 14.77, and diarrheal diseases, 9.26; these four items constituting 61.96 of the total rate for disease — 73.65.

‘Among the regular troops in Cuba in 1898 the death rate was exceedingly high, 98.16 per thousand men as compared with their admission rate of 2631.76. This means that during their service on this island slight cases were infrequent, or, which is more likely, were not taken upon sick report. The death rate from disease was 61.15; from injuries, 37.01, gunshot wounds having contributed 33.33 of the latter rate. The fatal diseases were typhoid fever, which caused a death rate of 14.17; yellow fever, which occasioned a rate of 17.57; malarial infections, 13.12, and diarrheal diseases, 9.97.

‘The volunteers in Porto Rico in 1898 had a death rate of 52.09, of which 49.43 was caused by disease. Typhoid fever was the deadly factor, it being held responsible for 40.66 deaths per thousand of strength. But for this epidemic of typhoid fever among these troops their medical record would have been comparatively good.

‘The regular troops also suffered from this epidemic, their total death rate having been 41.45 and their rate from disease 39.38, of which 22.80 was caused by typhoid fever and 5.70 by malarial diseases.

‘The volunteer troops serving in the Philippines in 1898 had an admission rate of 1832.10 per thousand men, 1719.73 from disease, and 112.36 from injury; 422.47 from malarial diseases, and 398.63 from diarrheal diseases. The death rate, 24.70 per thousand men, was constituted by 21.27 occasioned by disease and 3.43 by injury, 2.86 of the latter being the results of gunshot injuries. Typhoid fever caused deaths equivalent to 9.28 per thousand for the year; diarrheal diseases, 2.86; smallpox, 2.14, and malarial fevers, 1.43.

‘Among the regular troops the death rate in the Philippines was 22.74, 18.60 from disease and 4.13 from injury, 3.10 of the

latter from gunshot. Typhoid fever caused a death rate of 7.58; smallpox, 2.07, and malarial fevers and diarrheal diseases, 1.72 each.

'Among volunteers serving in the United States in 1898 the death rate amounted to 24.41 per thousand of mean strength for the year, of which 23.29 was due to disease and 1.11 to injury. Typhoid fever was the prominent cause of death, 16.39 of the total rate having been reported as due to it. The rate caused by malarial fevers was 1.26, by pneumonia 1, and by diarrheal disease 0.60.

'The death rate of the regulars in the United States in 1898 was 20.14, 17.45 from disease and 2.69 from injuries, of which 1.21 were from gunshot. Typhoid fever caused a rate of 8.79; malarial fevers, 2.24, and diarrheal disease, 1.39. A large proportion of the cases which gave the high death rate from disease were imported by the regular troops from Cuba.'¹

¹ *Surgeon General's Report*, 74-76.

PART FOUR
FROM THE SPANISH-AMERICAN WAR TO THE
WORLD WAR

A noble and puissant nation rousing
herself like a strong man after sleep.

MILTON: *Areopagitica*

PART FOUR

FROM THE SPANISH-AMERICAN WAR TO THE WORLD WAR

CHAPTER IX

SOME HISTORY OF THE PERIOD

AT the conclusion of the Spanish-American War, the United States found itself in possession of foreign lands on both sides of the world and under compulsion to garrison and administer them. These lands were all tropical, all relatively backward in education, sanitation, and economic and political outlooks; all used laws and languages different from our own, had social and racial problems which we had not yet faced, and were disturbed by recent war. In a very short time the largest and most distant of them, the Philippine Islands, offered in addition the problem of hostility to and extensive insurrection against our government. For these problems, as for the war which brought them, the country was unprepared, except that it had learned from bitter experience something of the handling of troops and of sanitation.

The government of the various islands had to be military in character, and it had in each instance to face large problems of sanitation, for the protection of its own forces as well as for the good of its wards. Military officers were made governors general of countries, governors of provinces and towns, and it is interesting to note that there was a general parallelism between their success in their jobs and their ability to visualize, grasp, and control the sanitary evils which afflicted the countries. This statement is not made in an effort to exalt medicine or the Medical Department of the Army. The explanation is thought to be simple, and is as follows: There is everywhere much talk of leadership, nowhere more than in the Army, and it is commonly assumed that it depends only upon personal qualities inherent in the leader.

As a matter of fact, it depends upon the state of mind of the followers as much as upon the leader. Men follow other men, as a rule, for their own personal advantage or because they think the other man capable of bringing about their hearts' desires, not because he is handsome, forceful, eloquent, or able, except as these qualities convince them of his ability to promote their desires. A country kept back in all ways by yellow fever and malaria is therefore likely to be grateful to one who rids it of these plagues, just as a country suffering from a tyrannical government is likely to be grateful to the leader who gets rid of that. In all of our new possessions health problems were of vast importance. In Cuba and Porto Rico these were grasped at once and concentrated efforts were made by the governments to master them. In the Philippines such was not the case. There were other differences than this in the make-ups of General Wood and General Otis, but it is doubtful if any other one difference was more important in determining their relative success as governors of countries. General Wood was strong, far-seeing, courageous, and persistent; he possessed the great leader's qualities of responsibility, initiative, resourcefulness, and knowledge of men; but it is doubtful if all of these qualities could have made him the successful tropical administrator he became had his education not been such as to cause him to appreciate the importance of sanitary problems.

In 1900, there was a great Chinese uprising, known as the Boxer Rebellion, against foreign domination in Chinese affairs, and the nations had to unite in a military expedition for the protection of foreign lives and property. America participated in this and in July sent a considerable force from the Philippines, two regiments of infantry, two troops of cavalry, and one battery of artillery, under the command of General Adna R. Chaffee. This force acquitted itself creditably, the campaign was short and the sick and wounded were well cared for and were evacuated in August to San Francisco. After the Boxers were defeated, an international force of occupation was left in the country, and we have ever since maintained a garrison at Tientsin and a few sub-

sidary posts. Typhoid was more prevalent among the Chinese than among the Filipinos and, probably in part because of the practice of employing cheap native helpers in kitchen work in both places, it became more prevalent among the troops in China.

After the close of the Spanish-American War, the American public, as usual, projected its own faults upon the head of its servants, and Secretary of War Alger was the scapegoat. He left Mr. McKinley's cabinet late in 1899, and was succeeded by the Honorable Elihu Root, whose clear mind and statesmanlike grasp of affairs were to prove of the greatest value in the reorganization of the Army and in starting it upon the career of study and hard work which made it over before the World War came upon us.

In September, 1901, President McKinley was assassinated. He was succeeded by Theodore Roosevelt, whose recent personal experience in the Army had given him a great interest in it and doubtless caused him to be the more active in his support of Mr. Root and his policies. Mr. Roosevelt was President when the province of Panama, which included the Isthmus, revolted against Colombia, and with a promptitude truly characteristic, although perhaps in this instance excessively so, he recognized the independence of the revolting province and received with almost equal promptness the right to construct an interoceanic canal across the Isthmus. From this resulted events of the greatest interest to the Medical Department, in addition to those which were of such strategic, economic, and political importance to the country at large.

To anticipate matters to be discussed later, it may be stated that yellow fever had by this time been abolished from Havana and from practically all of Cuba, as the direct result of the work of Army medical officers, supported and encouraged by General Wood. Major Gorgas, who was the officer in charge of the execution of this work, was appointed Chief Health Officer of the Panama Canal organization, and he wished to apply against the mosquito-borne diseases which made the Isthmus a pest-hole the same sort of measures that had given him success in Havana. He

was not a member of the Canal Commission, his plans involved the expenditure of large sums of money, and the eminent engineers who were in charge lacked General Wood's medical training and consequent appreciation of the importance of sanitary problems. They likewise had their own ideas as to what was needed.¹ Gorgas did his work for ten years under hampering conditions which would have disheartened a less persistent man. He preserved his equanimity, accomplished a marvelous triumph of sanitation, raised medical science tremendously in public esteem, became himself a world figure in medicine and sanitation, and made his subsequent appointment to the surgeon generalcy a virtual necessity, unless public opinion was to be flouted.

President Roosevelt appointed Mr. Taft to be the first civil governor of the Philippines, a position which enabled the latter to get a large first-hand knowledge of the Army, and prepared him to be a worthy successor of Mr. Root in the War Department, as he afterward was.

The Boer War in South Africa (1899-1902) was marked by the same kind of distressing and calamitous experiences with typhoid fever as we had had in the Spanish-American War, but the further advances in bacteriology and in knowledge of the processes of immunity there led to efforts to control the disease by vaccination or bacterial prophylaxis; the introduction into well men, by hypodermic injection, of large numbers of killed bacilli of typhoid fever, in the hope that the body would elaborate antibodies, substances which would destroy the germs of the disease or nullify their harmful effects, and so protect the injected man against subsequent infections. These experiments were not highly successful, but the results were sufficiently encouraging to cause the work to be kept up in the British Army and later to be taken up and given more extensive application in our own service, in 1909 and subsequently.

The Russo-Japanese War (1904-05), on the other hand, gave a

¹ Sullivan, Mark: *Our Times — The Turn of the Century*, 460. Charles Scribner's Sons, 1927.

great demonstration of the triumph of military sanitation unaided by typhoid vaccine, and of military efficiency brought about by the labors of a good general staff. Japanese military efficiency was a surprise to the Western world and its sanitary efficiency to Western medicine.

Colonels Valery Havard and John Van R. Hoff and Major Charles Lynch, of the Medical Corps of our Army, were sent as observers of this war, and study of their reports indicates that they returned home unable to explain wherein the Japanese had excelled us in sanitation. That they had excelled us was apparently shown by the fact that infectious diseases caused but 3.61 per cent of their total of sickness and wounds. The following figures were given by the Japanese War Office.¹

TABLE I

	PERCENTAGES OF THE TOTAL NUMBER OF PATIENTS	RESULTS			
		Cured	Died	Discharged for Disability	Remaining under Treatment
Wounds received in action . .	45.53	38.55	6.20	3.60	51.65
Other wounds and injuries . .	4.46	62.23	1.51	2.33	33.93
Contagious and infectious diseases	3.61	16.71	39.59		43.70
Other diseases	46.40	50.25	4.85	*1.19	43.71
Total	100.	44.25	6.57	2.29	46.89

TABLE II

	PER CENT
Killed in action	7.32
Died of wounds received in action	1.51
Wounded in action	24.27
Other wounded (accidents, etc.) and sick	27.11
Died from disease (not including infectious and contagious diseases) . .	1.24
Contagious diseases	1.93
Died of infectious and contagious diseases	0.76
Number never wounded or sick during war	35.86
Total	100.

¹ Seaman, Louis L.: *The Real Triumph of Japan*, 103. D. Appleton & Co., 1909.

TABLE III

	Percentages of Patients in Entire Army Corps at a Certain Date	Cured	Died	Discharged for Disability	Remaining Sick
Malaria.....	0.37	62.18	3.58	0.25	33.99
Beri-beri.....	24.30	48.39	5.88	0.12	45.61
Frost-bite.....	0.75	37.44	0.88	0.29	61.39
Dysentery.....	1.95	26.11	25.63		48.26
Typhoid.....	1.61	4.83	57.43		37.74
Smallpox.....	0.05	32.92	9.32		57.76
Wounds received in action..	45.53	38.55	6.20	3.60	51.65
All other wounds and injuries	3.71	67.22	1.64	2.74	28.40
All other diseases.....	21.73	52.13	3.71	2.39	41.77
Total.....	100.	44.25	6.57	2.29	46.89

The largest single cause of *disease* in the Japanese army was beri-beri, a deficiency disease of which the cause was still unknown and which was at the same time a major cause of sickness among our Filipino Scouts. The Japanese set a mark for the world to shoot at, and it is doubtful if their record has yet been equaled in some respects. It is true that we have excelled it in regard to typhoid and dysentery, but it is doubtful if any other nation has ever had so small a proportion of its sickness in war due to infectious disease. The Japanese carefully guarded the exact figures as to disease in the army, giving out only percentage tables such as those shown above, and careful comparisons with the figures of other wars cannot be made.¹

As early as 1879, George B. Selden, an American, applied for a patent on a vehicle driven by an internal combustion engine.

¹ Seaman uses these percentages as follows: 'Considering these two tables in connection with each other, an important fact is revealed. We know that the killed in action numbered 43,892 and that this sum represented 7.32 per cent of the army in the field. By a simple calculation we find that the number of men at the front must have been 599,617, or six hundred thousand in round numbers, a figure believed to be correct. Those who died of disease, exclusive of infectious and contagious diseases, amounted to 1.24 per cent of the entire army in the field, and those who died of contagious diseases amounted to 0.76. Therefore the entire deaths from all diseases amounted to exactly two per cent of the army in the field, a rate of twenty per thousand of strength. On a basis of an army of six hundred thousand this would mean that only twelve thousand men died of disease.' (Seaman: *The Real Triumph of Japan*, 104.)

During the next twenty years automobiles which would run were made in France, Germany, and America, and by the end of the century several different makes were on the market. In 1903 an automobile crossed the continent, and the following firms and others were making and selling cars: Apperson, Buick, Cadillac, Ford, Franklin, Haynes, Locomobile, Olds, Overland, Packard, Peerless, Pierce-Arrow, Stearns, Studebaker.

On December 17, 1903, the Wright brothers successfully flew an airplane at Kitty Hawk, North Carolina. These two inventions, the automobile and the airplane, were destined to affect profoundly the art of war, the former to change greatly the business and social life of America, and both to accomplish these results in large degree before our participation in the World War. With its usual conservatism, our Army avoided mad haste in the adoption of either. Also as usual, its conservatism was due largely to lack of funds.

Lieutenant Clyde Ford, Medical Corps, wrote repeatedly in 1901 and subsequent years urging the use of motor ambulances. On March 28, 1906, one was obtained for use at Washington Barracks. It was a Ruger ambulance body mounted on a White steam motor truck chassis. Later purchases had gasoline engines. By 1912, motor ambulances were in use at Letterman General Hospital, Fort Riley, Fort Leavenworth, Fort D. A. Russell, and Fort Bayard. They were not yet a success. In that year, by act of March 3, 1911, the procurement of ambulances was entrusted to the Medical Department, which was charged with it until 1917.

In August, 1912, the Surgeon General obtained twelve motor ambulances from the Keeton Motor Company. These were not very satisfactory and the company failed, so no more were purchased. In August, 1914, one motor ambulance was sent to an ambulance company at Texas City and others were used in maneuver camps. By October of that year they were in use at fourteen posts and hospitals. A board of medical officers was appointed to meet in Washington, D.C., on July 10, 1915, to investigate and report upon a motor ambulance suitable for field

use by the Medical Department, and in September the Surgeon General vigorously urged the motorization of the greater part of the ambulance service.

The board of officers met and was in session at various times, with some changes of personnel, until the end of the World War. In 1917, it decided on a standard model ambulance for the Army and a lighter type for use with the French army, and it deserves large credit for the success attending the use of both types.¹

In 1912, Congress appropriated \$100,000 for the purchase, maintenance, operation, and repair of aircraft, and the following year the Army possessed fifteen airplanes and a continuous flight of two hundred and forty miles had been made. In 1914, an Aviation Section, composed of sixty detailed officers and two hundred and fifty enlisted men, was established in the Signal Corps. Aviation medicine came with the World War.²

On April 18, 1906, a large part of San Francisco was destroyed by earthquake and fire, with the result that tens of thousands of people were rendered homeless and resourceless. The Army at once lent its aid. Colonel George H. Torney, Medical Corps, was put in control of the sanitation of the city and the Army general hospital at the Presidio was thrown open to the sick and the injured. Torney was an able man and he had with him a group of very able assistants, and the entire job was handled excellently. This good work, San Francisco's gratitude, and possibly a bit of shrewd political utilization of both made secure for Torney the appointment to the surgeon generalcy when General O'Reilly retired.

President Roosevelt, physically strenuous and in advance of the fashion of to-day, objected to the tendency to obesity shown by many middle-aged officers, and he instituted an annual physical test for all field officers. Medical examination followed the test and this was also given to junior officers. Many weaknesses

¹ Wolf, Edwin P., Colonel, Medical Corps: manuscript history of the Supply Division of the S.G.O.

² Hathaway, L. M.: *Military Surgeon* (June, 1928), 725.

and defects were discovered and some officers were retired. The annual test of three daily rides of thirty miles each or walks of twenty miles each were later abandoned as the habit of exercise became general, but the annual physical examination is still given and officers found to have physical defects are required to submit themselves to needed treatment. This has resulted in great good to individual officers, but it is a just criticism of the service to say that no other use has been made of the vast number of reports of examinations now filed in the Adjutant General's office with the personal records of officers. It is conceivable that a careful study of those reports over a period of years would shed valuable light upon the progress and possibly upon the causes and means of prevention of several diseases, especially such slow, degenerative troubles as chronic Bright's disease, arterio-sclerosis, heart diseases, and chronic joint troubles. It is a matter for congratulation that Lieutenant Colonel A. G. Love, Medical Corps, who is eminently qualified for such work, is now undertaking the study of these reports.

Mexico, after thirty years of relative quiescence under the mild and, on the whole, beneficent tyranny of Porfirio Diaz, had by 1910 reached such a state of enlightenment as to realize that it was an unhappy and backward country, a realization helped by economic depression, crop failures, and enlarged contact with foreigners, who had entered the country in considerable numbers to exploit its natural resources. Francisco Madero voiced the discontent, was arrested, escaped, organized a revolutionary movement, and brought to bear sufficient force to bring about Diaz's resignation and his departure from the country in May, 1911. Madero was elected president and took office the following October, by which time his former supporters had begun to revolt against him. There was much fighting and many foreigners were killed. In February, 1913, Victoriano Huerta seized the presidency and executed Madero. President Wilson refused to recognize Huerta as the lawful head of the state and General Carranza headed an uprising which brought about Huerta's resignation in

July, 1914. Carranza obtained control of the capital, but revolts led by Villa and Zapata drove him out, and in 1915 there were four factions claiming control of the government. In October, Carranza was recognized as *de facto* president. Villa ignored this settlement and in January, 1916, a band of his adherents assassinated eighteen Americans taken from a train in Mexico. In March, he raided Columbus, New Mexico, killing seventeen Americans. A punitive expedition of 12,000 troops under General Pershing was sent into Mexico after him. The expedition accomplished little beyond showing up some of the Army's shortages in transportation, and it was withdrawn in February, 1917.

During all of the period of seven years here sketched, the relations between Mexico and the United States were far from ideal; a division of troops was mobilized in Texas and a brigade in Southern California in 1911; Vera Cruz was occupied in 1913; and in 1916, National Guard troops, as well as Regular Army, were mobilized on the border. These mobilizations were important to the Medical Department, not only as they were to the Army in general, by showing up faults and needs and leading to their correction, and in affording much-needed training of officers and men, but also in other ways. The concentration of a division in 1911 without any spread of typhoid was exploited in a manner worthy of the commercial methods of the day for the 'sale' of typhoid prophylaxis to the Army, and it was successful. From that time to the present the Army has willingly accepted universal typhoid prophylaxis, and, as the mistake of neglect of sanitary measures was avoided, the result is only good from an Army standpoint. The larger concentration in 1916 and the expedition into Mexico amplified the training features for all branches of the service, and brought into particular notice and helped prepare for their valuable service later in France some of the medical officers who there held important positions. Colonel Ireland, who then had the station hospital at San Antonio, became Chief Surgeon, A.E.F.; Colonel McCaw, Chief Surgeon of the Department, became assistant to Ireland in France and later succeeded him; Colonel Glen-

nan, Chief Surgeon of General Pershing's expedition, had charge of the enormous problem of hospitalization in France; and many other officers there did good work which later led to large tasks in the World War.

During this period of Mexican disturbance the war cloud which for years had hung over the Balkans burst and precipitated upon Europe such a flood of troubles as had not been seen since Napoleonic days. For years Europe had been an armed camp, all of the great Continental countries having universal military service and maintaining armaments under which the people groaned. Since 1870, taught by Germany, methods of speedy mobilization had been studied and as far as possible perfected by all, with the intent in each country to minimize the time necessary to put the entire nation in arms. For years trade rivalry, colonial rivalry, and a race for raw products had promoted national jealousies, suspicions, and dislikes. It is now apparent that only a spark was needed to ignite the combustible material and start a most tremendous conflagration. That spark was furnished on June 28, 1914, when Archduke Franz Ferdinand, heir to the throne of Austria-Hungary, and his wife were assassinated in the town of Sarajevo, the capital of Bosnia. An official inquiry was made and on July 23d, Austria-Hungary published an ultimatum which it had served upon the Kingdom of Serbia, demanding that the latter country admit responsibility for the assassination, punish certain of its own subjects, and permit Austria to suppress or punish on Serbian soil all actions inimical to the Austrian Government. The demand seemed to call for a virtual surrender of Serbian sovereignty, and an answer was demanded within forty-eight hours. All Europe was greatly perturbed and many countries tried to persuade Austria to soften her terms. Russia, long regarding herself and regarded by others as spokesman for and protector of Slav peoples, was particularly concerned, as not to befriend Serbia would injure or destroy her prestige in the Balkans. Serbia made a humble reply to Austria, tried to preserve her independent status, and requested reference of the matters

to the Hague Tribunal. Austria declared war upon Serbia on July 28th. Russia ordered mobilization. Both Austria and Russia were bound by military alliances and neither could move alone. Germany stood by Austria. England and France tried earnestly to head off war, but unsuccessfully. On July 31st, Russia ordered general mobilization. On August 1st, Germany demanded that Russia immediately demobilize and served upon her a declaration of war unless this were ordered at once. Without further discussion of the responsibility for the war and the diplomatic efforts to head it off, it may be stated that on August 3d Germany demanded free passage of her troops through Belgium to attack France. This was refused, Germany attacked Belgium, France and England came to the latter's aid, and Europe was divided into two hostile camps, Germany and Austria-Hungary on the one side, Russia, France, England, Belgium, Serbia on the other.

Our interests, our trade, our subjects in Europe, and our sympathies were all profoundly affected. The sympathies were divided, however. What percentage of our people sympathized with each side cannot be known, but at that time a large number sympathized with Germany, influenced thereto by blood, birth, or education, by hereditary American and imported Irish dislike of England, and by other factors. President Wilson assumed for the country a position of absolute neutrality, the only position possible. Thus for almost three years, until April, 1917, we watched the conflict, dealt with each side as freely as the other side would permit, made and sold war munitions in vast amounts, feared and foresaw our own necessary entry into the war, took thought as to our military policy of national defense. Gradually sentiment favored Germany less and France and England more; gradually it demanded, through private agencies, preparation for war; gradually German arrogance and stupidity strengthened these changes of sentiment and cumulative German attacks on our shipping and disregard of American lives on the sea drove us to oppose her actively. America entered the war on the side of the Allies in April, 1917, with her people as nearly united in aim and

desire as could ever be expected, flaming with idealism and enthusiasm, and with high purpose to end not only the war then raging, but to end all wars and to make the world safe for democracy. Woodrow Wilson was the embodiment and the mouth-piece of the popular thought. We have since grown shamefaced about that emotional period, but it may well be that we are the better for hitching our wagon to a star. At any rate, not all of us regret it. Certainly it carried America to great achievements and it gave us an army such as we never saw before, an army which would have been impossible without just such popular support as it had. Self-abnegation was the rule. Our people were united for a purpose which they deemed great, and the average man willingly sank his private ambitions and desires and gave himself and his efforts to the promotion of the common aim, to the construction of a great war machine for crushing an evil thing. And neither last nor least among the far-seeing, the enthusiastic and the patriotic, was the medical profession of the country. The American Medical Association, the American Surgical Association, the Congress of American Physicians and Surgeons, the Clinical Congress of Surgeons, and the American College of Surgeons all declared for preparedness, and a survey and inventory of the medical resources of the country was undertaken in the spring of 1916. The entire profession was interested; when war came it was ready, was prompt, and was not excelled, even if equaled, in cheerful and understanding self-sacrifice by any other group of our population.

CHAPTER X

THE ARMY ORGANIZATION AND TRAINING

AFTER the Spanish-American War the Dodge Commission reported as follows in regard to authority and responsibility in the War Department:

‘For many years the divided authority and responsibility in the War Department has produced friction, for which, in the interest of the service, a remedy, if possible, should be applied. The Constitution makes the President the Commander-in-Chief of the Army, and he cannot transfer that authority to any other person. The President selects his Secretary of War, who has his confidence, and who is his confidential adviser. The Commanding General is assigned to duty as such by the President, and under the Military Laws of the United States his duties are defined as follows:

“The Command exercised by the Commanding General of the Army, not having been made the subject of statutory regulation, is determined by the order of assignment. It has been habitually composed of the aggregate of the several territorial commands that have been or may be created by the President.

“The military establishment is under orders of the commanding general of the Army in that which pertains to its discipline and military control. The fiscal affairs of the Army are conducted by the Secretary of War through the several staff departments. (Par. 187, A.R., 1895.)

“All orders and instructions from the President or Secretary of War relating to military operations or affecting the military control and discipline of the Army will be promulgated through the commanding general. (Par. 188, A.R., 1895.)”

‘The President must have the same power of selection of his general-in-chief as he has of his Secretary of War; without this there can be no guaranty that he will give, or that the Secretary

of War will place in the general-in-chief, 'that confidence which is necessary to perfect harmony. Neither the President nor the Secretary of War should have in the command of the Army an officer who is not working in harmony with him.' ¹

A change was not immediately possible, as it was thought to require legislation by Congress, which had not yet seen the light and which, moreover, had problems more urgently pressing in providing for the government and control of the new insular possessions, in getting rid of the war volunteers and providing another volunteer army for Philippines service, and in other post-war and pre-election matters. Furthermore, only a few army officers realized the real wisdom of the Dodge Commission's recommendations or the real needs of the Army.

When Mr. Root became Secretary of War, he at once began to inform himself of the Army's needs, and with great clearness of vision he saw the fundamental lacks to be three in number, a military policy for the nation, military education and training for the Army, and a planning and coördinating agency, a general staff, between the Army and the Secretary of War. To the satisfaction of these needs he set his mind.

The lack of a military policy was known to all men and General Emery Upton had years before written lucidly and convincingly upon the subject and upon the disasters flowing from the lack, but the mood of the country was not then such as to grant a favorable reception to his work. Upton's Report, for such it was, was cut short by his death, and it had been forgotten. Root brought it to light and had it published, and from that grew a popular conviction as to the military needs, which conviction brought to fruition in the National Defense Act of 1916, the seed planted by Upton in 1881.

The need for military education was directly attributable: (1) to the policy which had been pursued toward the Army since the close of the Civil War, a policy of parsimony and neglect, of get-

¹ *Conduct of War Department in the War with Spain, Report of Dodge Commission*, I, 115-16.

ting the most possible hard work out of the smallest possible army, of separating it into small and widely scattered posts, of regarding it as a peace-time police force and trusting to God, patriotism, and inspiration to win any war which might arise, and (2) to the induction into the Army of large numbers of officers from the volunteers. To correct this need Secretary Root established a War College, revived the special service schools at Fort Leavenworth, Fort Riley, and Fort Monroe, changed the Leavenworth School from the Infantry and Cavalry School to the Staff College, and started garrison schools upon new and more useful lines. Then began that career of study upon which the success and even the continuance of the Army officer's official life has come to depend.

The system has been enlarged and improved since Mr. Root's time in the War Department, but in plan and general outline it is the same. It has been of tremendous benefit. Instruction in practical sanitation, and study and examinations in military hygiene were included in the school courses. So well was the work done, such interest was shown by line officers, and so well has the instruction kept up to date that it is no exaggeration to say that the average line officer of to-day and the average cadet graduating from West Point have more definite and practical knowledge of the prevention of disease in armies than did the best medical officers of the Civil War and most of those of the Spanish-American War. Their possession and use of such knowledge has been an important factor in improving the health of the Army and in making the line appreciative of and sympathetic with the work of medical officers. Colonel Valery Havard's excellent textbook on military hygiene helped greatly in popularizing the subject.

The third great need, that of a coördinating and planning agency under a single command, was of primary importance and was founded in organizational faults of long standing.

In 1828, General Macomb, having been appointed major general, was directed by the President 'to assume command of the

Army.' General Winfield Scott succeeded General Macomb in 1841 and issued an order assuming command of the Army, which he held until his retirement. On July 11, 1862, President Lincoln ordered General Halleck to Washington to be General-in-Chief of all the land forces of the United States, which position and title he held until 1864. After General Grant was made Commander-in-Chief, Halleck was known and signed as Chief of Staff. It is probable that he was always more chief of staff than commander and that he was always subordinate and adviser to Secretary Stanton.

The Constitution makes the President the Commander-in-Chief of the Army, and he exercises his power as such through the Secretary of War and numerous bureaus. Even before the adoption of the Constitution and the establishment of the Presidency, Congress had, in 1781, created the office of Secretary at War. The Secretary reported to the Congress and conducted the War Department under it, as he afterward did under the President. As early as 1831, General Macomb wrote to the Secretary, Lewis Cass, complaining that the staff bureaus 'act so independently [of the general commanding] that one would suppose they did not belong to the same service.' He also said: 'It is the province of the War Department with the approval of the President to make such rules and regulations as shall be proper and necessary for the government of the Army. But I presume it was never contemplated to make regulations which could render the several departments so separated and disconnected from the commander of the Army as to leave him the troops without the power to control, support, or conduct them — the means of the General Staff.' His presumption was true. The condition had not been contemplated; in fact nothing in regard to the Army had been contemplated very seriously or with too great intelligence. Generals Scott, Grant, Sherman, Sheridan, Schofield, and Miles all had the same difficulties, and the first four at times removed their headquarters from Washington and virtually abandoned the effort to fulfill their impossible tasks. General Schofield, having been Secretary

of War under President Grant, saw the problem with larger vision, recognized that 'The Constitution makes the President the Commander-in-Chief [and] there cannot possibly be under him another commander acting independently of his War Minister'; and, instead of regarding his position as had other commanding generals, he frankly looked upon himself as a chief of staff and military adviser to the Secretary and the President, and he testified to the success of the arrangement.

During all of these years of divided authority, pulling at cross-purposes, misunderstanding, and recrimination, the commanding generals and the line of the Army blamed the successive secretaries and the staff corps, thought them ignorant of the Army's needs, self-seeking, greedy for power and authority, and scheming for them by unworthy political trades. This was not altogether true. Possibly the secretaries and the staff did not always know best as to the Army's needs, probably they were sufficiently human and ambitious to enjoy power and to seek personal advancement, but there is no reason to believe that they were in general less patriotic, less devoted to the service, or more ambitious than were the commanding generals. It was natural that men who had specialized for years in particular lines of work should feel that they understood those lines better than the man who had not so specialized. Furthermore, they were carrying out duties specifically assigned to them by law. In 1902, Secretary Root testified that 'there are no duties prescribed by statute for the Commanding General of the Army, except that Congress has said that he shall be a member of the Board of Ordnance and Fortification and a member of the Board of Governors of the Soldiers' Home.'

It is apparent that the fault was not all on one side and that the conflict was inevitable except by one of three means: (1) abdication by the President of his duties as Commander-in-Chief, as was done by Lincoln in 1864; (2) abandonment by the Commanding General of all attempts to command independently, as was done by General Schofield; (3) abolition of the office of Commanding

General of the Army and the establishment of that of a Chief of Staff with an assisting General Staff, as proposed by Secretary Root. Coördination and planning had of course been necessary in all of our wars, but they were done usually and almost of necessity by the Adjutant General and his department. Secretary Root testified: 'So, in the war with Spain, after we got fairly into it, General Miles went to Porto Rico and the Adjutant General performed the duties of Chief of Staff here in Washington. He performed those duties ably, and he could perform those duties ably because he was of extraordinary physique and executive capacity and able to do two men's work. No man should be called upon to perform both the duties of Adjutant General and Chief of Staff, or to perform the duties of Assistant Adjutant General and of member of the General Staff, as the members of the Adjutant General's Department did during the war with Spain.' He also testified: 'If we had not had an Adjutant General with the strength of ten men, with a wonderful physique and extraordinary executive capacity, the whole system would have broken down absolutely.' To think that General Corbin, the Adjutant General referred to by Mr. Root, General Sternberg, and other department heads of that day were less interested in the success of the Army than was the commanding general was foolish, but many officers did think so.

Despite the vigorous opposition of General Miles, the Secretary persuaded Congress to authorize a General Staff and a Chief of Staff and to abolish the office of Commanding General of the Army, and the service began the progressive course which it has since followed.

So severely had the Medical Department suffered from neglect and from lack of coördination of its work with that of the line of the Army that it is perhaps not greatly to its credit and foresight that from the beginning it hoped for better things under the new régime. It did so hope and it was not disappointed. The General Staff scheme gave it an opportunity to present its needs, to talk them over, to coördinate them with other needs of the Army, to

make it the business of somebody other than 'doctors' to see that those needs were met, to obtain recognition as an essential and not unimportant part of the military machine. Of all those things the line in general was ignorant. On the General Staff they had the opportunity to learn. They required education; the new members of the staff, being called the 'Brains of the Army,' took themselves rather seriously, and there was quite a long period during which the Surgeon General's Office had to expend much time and patience in 'demonstrating axioms and defending first principles' in regard to matters medical, but neither the time nor the effort was wasted. The department has grown in importance, usefulness, and efficiency under the régime of the General Staff, and despite occasional differences of opinion in regard to special matters that arise, it wishes nothing better than such fairness and support as have generally characterized the General Staff's treatment of it.¹

In the period 1899 to 1917, there were several pieces of legislation which were of importance to the Army and the Medical Department. These will be described briefly.

The men who had enlisted for the Spanish-American War did so for the duration of the war, and as soon as the peace protocol was signed, they, their friends, and their Congressmen began to clamor for their discharge. So great was the pressure that 100,000 of them were discharged before the treaty of peace was signed (December 10, 1898). Similar action in the Philippines, where trouble was brewing, would have been disastrous. The men there were not discharged, but were held quite legally until the confirmation of the peace treaty (April 11, 1899) and for a few months

¹ Notwithstanding the fact that the Medical Department has come into its own under the régime of the General Staff, it is not contended that the latter organization is perfect, that it has accomplished all that was hoped from it, or that it succeeded in avoiding all confusion and disorder in the conduct of war. The discussion of its successes and failures, except as they relate to the Medical Department, is not properly a part of the latter's history. Major General Johnson Hagood has discussed it with much knowledge, much thoughtfulness, and some severity in his book, *The Services of Supply*. (Houghton Mifflin Company, 1927.)

longer without justification other than the need for them, a justification which was made to apply to the Hospital Corps even longer than to regiments. An act of March 2, 1899, reorganized the Army, fixing the strength of the Regular Army at 65,000 men and authorizing a volunteer force of 35,000 to be organized into twenty-seven regiments of infantry and two regiments of cavalry. One surgeon and two assistants were authorized for each volunteer regiment. The Medical Corps of the Regular Army remained as in 1892. A certain number of the officers of volunteers, including most of the regimental surgeons, were detailed from the regular service. It was provided that the volunteer regiments should cease to exist by July 1, 1901.

An act of February 2, 1901, authorized for the Regular Army a strength of 100,619 officers and men. It provided for rotating details of officers from line to staff corps, for regiments of three battalions, and for permanent camps for field instruction. It increased the Medical Corps from 192 to 321 officers, authorized the President to appoint for service in the Philippine Islands 50 surgeons of volunteers with the rank of major and 150 assistant surgeons with the rank of captain, for a period of two years, and increased the number of hospital stewards from 200 to 300. It authorized the employment under contract of 30 dental surgeons, and gave the Nurse Corps (female) statutory recognition. This act did the Medical Department an injustice by giving the increase in numbers almost wholly in the lower grades and making the prospects for promotion very poor.

The 'Dick Bill,' an act of January 21, 1903, was important in military history because it recognized the militia and provided for its serious training and for the detail of regular officers to temporary duty with it.

The act of February 14, 1903, created the General Staff and was of very great importance. The matter has already been discussed.

An act of March 2, 1903, provided 'that hereafter the Hospital Corps . . . shall consist of sergeants first class, sergeants, cor-

porals, privates first class and privates: the rank and pay of sergeants first class, sergeants and privates first class shall be as now provided by law for hospital stewards, acting hospital stewards and privates of the Hospital Corps, etc.' Thus passed the ancient and honorable title of hospital steward.

An event which interested the Medical Corps in 1904 was the abolition of the title of Adjutant General. General Corbin was made a major general of the line and the department became the Military Secretary's Department. Brigadier General Fred. C. Ainsworth, who had been in charge of the Division of Records and Pensions in the Surgeon General's Office and had been given a brigadier generalship for the excellence of his work there, was made Military Secretary, and the Record and Pension Office was taken over by the new department. After two years the title of Military Secretary was dropped and Ainsworth became The Adjutant General.

General Johnson Hagood, who served as assistant to Ainsworth, describes him as 'one of the ablest and most brilliant executives and administrators the Army ever had and one of its best friends, though few officers of the line knew it. He understood Congress and knew how to get things out of Congress. He was the power behind the throne in securing much of the most beneficial and far-reaching legislation ever obtained in the Army, though his name was never mentioned in connection with it. Among other things he was responsible, more than any other one man, for the Army Pay Bill of 1908, credit for which is generally given to me.'

In 1906, threatened uprisings in Cuba caused intervention by the United States under the terms of the Platt Amendment, and the Army was sent back there after an absence of four years. Cuba was this time occupied for two years, and the troops were then withdrawn permanently.

An act of April 23, 1908, reorganized the Medical Department and made important changes: (1) it increased the Medical Corps by six colonels, twelve lieutenant colonels, forty-five majors, and

sixty captains or first lieutenants; (2) it gave the captaincy after three years of service; (3) it provided for the increase by four annual increments; (4) it provided for promotion examination to all grades below surgeon general; (5) it provided for a Medical Reserve Corps and for the assignment of members to active service, and for commission of contract surgeons in this Corps. All applicants for the Corps were to be first examined as to their physical, mental, and moral qualifications and to be commissioned only if satisfactory. This was the beginning of the great Officers' Reserve Corps which later included officers of all branches, and the Medical Corps takes proper pride in its initiative in this important matter. Prior to this it had a reserve of nurses, but it was very small. Miss Jane Delano, Superintendent of Nurses, conceived the idea of having the Red Cross handle this matter. She resigned her office, went to the Red Cross, and did a great constructive work in building up a reserve of investigated, examined, and registered nurses numbering more than 20,000. When we entered the World War, all that the Medical Department needed to do to get nurses was to ask the Red Cross for them. They were supplied and were then inducted into Government service.

An act of May 11, 1908, increased the pay of the Army. Several medical officers who received promotion and pay increase at the same time bought automobiles, in 1908 a sign of prosperity and of ready money. Shortly after this the country, especially the East, began to discriminate against the uniform. Soldiers in uniform were at times refused admission to theaters, hotels, and other places of entertainment. In 1911 Congress passed a law against such practices and some prosecutions were brought before they were ended. Inasmuch as the private soldier's pay had only been increased from \$13 to \$15 per month, it is not believed that offensive affluence was the cause of the discrimination.

Leonard Wood, who, at the outbreak of the Spanish-American War, was a captain and assistant surgeon, was made Chief of Staff in 1910. He never showed any favors to the Medical Depart-

ment. On the contrary, many medical officers thought that he leaned backward in his desire to avoid any appearance of doing so.

An act of March 3, 1911, permitted the detail of officer instructors to the National Guard, such details to create vacancies for promotions. The appointment of sixty dental surgeons with the rank of first lieutenant was authorized.

An act of April 24, 1912, recognized the National Red Cross, authorized the President to accept its coöperation with the sanitary services of the Army and Navy and to employ it under those services in conformity with such rules and regulations as he might prescribe, and for the payment by the United States for the transportation of personnel and gifts of supplies as accepted. Following this act, on September 10, 1912, the Surgeon General issued Circular No. 8, which was a statement of policy and regulations under which Red Cross units for operation in war could be organized and later be accepted by the Medical Department and operated under it. Little was done along these lines, however, until 1916, when Colonel Jefferson R. Kean was detailed to duty with the Red Cross and placed in charge of the organization of base hospitals. The work was facilitated by the fact that a number of medical men from America had by that time been abroad in the medical service of England or of France and had seen and brought back word of the immensity of the medical work in the war and the necessity for much time-consuming preparation for it. Hospitals and medical colleges were asked to form units for base hospitals, with the commissioned, enlisted, and nursing personnel complete, in accordance with the tables of organization, all to be taken into the Federal service when called.

Eventually fifty of these large hospitals were organized and accepted, and all but one were sent overseas, where they constituted the backbone of the American hospitalization system.

Meanwhile Lieutenant Colonel Robert U. Patterson was in charge of the Red Cross organization of ambulance companies, and early in the war forty-six motorized companies were sent overseas, where they did splendid service, mainly with the French

but also later with the American Army. These Red Cross units and the Medical Reserve Corps enabled the Medical Department to enter the war before any other branch of the Army. It is to be noted that their early readiness for service was largely due to the fact that they were prepared in advance of war without special appropriations from Congress.

An act of August 24, 1912, consolidated the Quartermaster's, Subsistence, and Pay Departments, but this was much overshadowed in popular interest by the 'Manchu' provisions of the same act, which provided that officers who had not served two years out of the preceding six with combat troops should immediately be returned to duty with them. This broke up many happy and well-settled homes, and it caused a good deal of disturbance in service schools and some staff departments, but it was regarded with satisfaction by most of the Army.

New Tables of Organization and Field Service Regulations were issued in 1914, and their study was taken up by the Army with avidity. Interest in all military matters was keen and the maneuvers were each year important events. Two training camps for students had been opened in 1913; four were used this year. An act of April 25, 1914, laid down a policy in regard to volunteer forces, their organization and efficiency. One of 1915 provided for fortification of the Panama Canal. The World War was in progress and we were neutral. General Wood was urging preparedness, and when he offered summer military training without pay at Plattsburg, New York, he had a good attendance of business and professional men. This and the training camps for students, started by General Wood when Chief of Staff, were the beginnings of the training camp system which became such a great thing after we entered the war. In 1914 appeared Colonel Louis A. La Garde's excellent work on 'Gunshot Injuries.'¹

Meanwhile the training of medical officers in field work and medical tactics had begun and was making rapid progress. Schools and companies of instruction for the Hospital Corps antedated

¹ Wm. Wood & Co., Philadelphia.

the Spanish-American War and were continued thereafter. In 1900-01, there were three such schools. The personnel of two schools was organized into companies, known as 1 and 2, later as A and B. In 1903, one of these companies participated in maneuvers at West Point, Kentucky, and Fort Riley, Kansas; in 1904, at Manassas and Thoroughfare Gap. The companies had field hospital and ambulance sections, with equipment. The work done consisted mainly of the location and erection of the field hospitals, first-aid demonstration, litter drill and ambulance drill. In 1909, articles began to appear in journals here and abroad on the subject of medical service in campaign, sanitary tactics, modern organization of medical departments for the field. In our own Army, Colonel Valery Havard, Major Paul F. Straub, and Major E. L. Munson were lecturing and writing. To these two majors, Straub a member of the General Staff on duty at the War College and Munson instructor in 'the care of troops' at the Line and Staff College at Fort Leavenworth, was due the real awakening and instruction of the Medical Corps in regard to field work. Colonel Straub prepared a book, 'Medical Service in Campaign,' which appeared in 1910, was issued to medical officers, met with great favor, and was very important in rousing interest in the subject. Colonel Munson has well stated the history of this work from his standpoint. The following quotations are from the personal letter in which he was so kind as to do this:

'In the autumn of 1908, I reported for duty at the Army Service Schools, Fort Leavenworth, Kansas, as instructor in the department of "Care of Troops," or military hygiene. There were two classes of officers at the Army Service Schools; all student officers being line officers. The first-year men constituted the "line class." Those graduating higher in the "line" course were retained for a second year in the "staff class," which was preparatory to later attendance at the Army War College. It was before the era of "compulsory education." The officers who came as students were voluntary seekers for information and improvement. I look back now, as I saw then, and regard them as a

self-selected "intelligentsia" of the Army. I mention this because most of the officers there as students had high rank in the World War, determined its policies, and thereby made the task of the Medical Department easier by personal understanding of its difficulties.

'In reorganizing and amplifying the schedule for the subject of "Care of Troops," both the "line" and "staff" classes came under instruction. The subject was made practical, and the student officers showed much interest in it. This was especially the case after I had studied the general curriculum; and had linked up military hygiene as a conservation measure, that very clearly bore directly upon various problems in the "Department of Military Art."

'In order to work out the latter relationship to best advantage, I personally attended both the "line" and "staff" courses in Military Art as an unofficial student. Especially did I attend the map problems, war games and tactical walks. This I did for several years, practically taking the work of each class in Military Art twice over.

'This work opened practically a new and most interesting field to me, for at that time medical officers did not know, were not expected to know, and it was too commonly presumed should not know, anything about the tactical handling of troops. . . .

'Accepting that the Medical Department was an integral part of the general military force, it seemed logical to suppose that there must always be some best plan for its distribution and functioning; more, that such plan ought to conform to certain general tactical principles of its own, which would apply to it, with appropriate local modifications, under any and all conditions. . . .

'The general failure by tacticians to recognize medical units as tactical elements had resulted in the medical service being regarded as something to be utilized after battles were fought, and not concurrently with the combat units except so far as the medical service directly attached to combat units was concerned.

It was accepted that wounded ought to be got to aid stations as soon as possible — but nothing whatever was laid down as to the location of relief stations, distribution of personnel, field of function, or similar matters. Removal of wounded to the rear was regarded as an aftermath of battle, scarcely to be attempted until battle was over. . . .

‘Major (now Major General) John F. Morrison saw the importance of the matter at once; and as Assistant Commandant and senior instructor in Military Art he was in position to give help. He realised also the complete lack of information of officers of all branches of the Army in the matter, and agreed that something should be done to give the subject not only a military status but publicity. Through him, the winter of 1909–1910, the first medico-military problem given in the United States Army was solved by the “Line Class” at The Army Service Schools. In further effort, he and the undersigned collaborated in the publication of a hand book entitled “A Study in Troop Leading and Management of the Sanitary Service in War.” This book appeared in 1910. It took up the tactical dispositions of a division of combat troops in a hypothetical battle, by different time periods in that battle; and these were then followed by the medical dispositions appropriate in each case.

‘Almost simultaneously with this book by Major Morrison and myself appeared a hand book “Medical Service in Campaign,” by Major Paul F. Straub, M.C. Neither one of us knew of the other’s efforts along parallel lines. Fortunately, each supplemented the other. Major Straub’s book largely consisted of rules, principles were exemplified. . . .

‘By the fall of 1911, medical tactics had been so thoroughly accepted at The Army Service School that the undersigned found no difficulty in getting a school order passed that *no combatant problem, implying combat with an enemy, should thereafter be considered as solved until the student officer had demonstrated a suitable disposition of the medical detachments, organizations and wounded.* This focused personal interest in the matter, as the marks of stu-

dent officers were thereafter affected by the suitability of their medical dispositions.

'In the fall of 1911, also, the War Department was requested to establish the "Field Service and Correspondence School of Medical Officers" as part of the group of schools at Fort Leavenworth. This school was to function for a six weeks' course; and because of limited facilities, the attendance was to be fixed at twelve officers. The request was granted, the school was established, and six majors of the regular Medical Corps, and six officers of the National Guard, from five States and the Territory of Hawaii, attended in the spring of 1912. The work was very successful, and except during the war, this school continued to function at Fort Leavenworth until it was transferred to Carlisle Barracks, Pa., after the World War, when it formed the nucleus of the medical training center now there.

'Along with the organization of the Medical Field Service School at Fort Leavenworth, the request to maintain a Correspondence School along similar lines was also granted. This Correspondence School was started with about twenty-five students enrolled (anonymously, by number given in the Surgeon General's Office only).

'In the spring of 1912, the basic importance of the subject was so firmly established that the undersigned wrote to the Surgeon General, recommending that its elementary outline be included in the curriculum of the Army Medical School for the young men entering the Medical Corps. This letter was referred to the then President of the Army Medical School, the course in which then consumed eight months. He, however, returned it with an endorsement to the effect that the course at the Army Medical School was already taken up with more important subjects — however, if the Surgeon General desired it, *one* hour might be found during the course to give instructions on this subject. On receipt of this reply, the matter was dropped. It is interesting, however, to compare this attitude as late as 1912, with the present one in which a special school is maintained in this subject

and its curriculum of three and one half months regarded by many as not being enough.'

With the progress of the war in Europe, which resulted in much interference with our nationals abroad, our commerce and our shipping, and under the urge of the General Staff's recommendations and of public opinion, Congress in 1916 passed the National Defense Act, which the President approved on June 3d. It is too long to be quoted or even to be discussed here in its entirety, but its outstanding features and the parts dealing with the Medical Department must be mentioned. The act defined the Army of the United States as consisting of the Regular Army, the Volunteer Army, the Officers' Reserve Corps, the Enlisted Reserve Corps, the National Guard while in Federal service, and such other land forces as might be authorized. It limited the enlisted strength of the Regular Army, exclusive of Philippine Scouts and enlisted men of the Quartermaster Corps, Medical Department, Signal Corps, and unassigned recruits, to 175,000, except in emergencies.

It prescribed organization into brigades, divisions, and, at the discretion of the President, into corps and armies. It prescribed sanitary trains for divisions, corps, and armies.

This act, although not perfect and subjected to important modifications since the World War, was the most important piece of preparedness legislation ever passed before any of our wars. It laid down sound and important policies and prescribed an organization, and when, in the following year, we were drawn into the World War, the country was able to proceed at once to its great task with that task partly outlined and an army organization and training plan prescribed. There was, of course, much confusion, many mistakes, and large wastage of money, and General Hagood tells us that the General Staff broke down and had to be made over after the war began. Nevertheless, the procedure was strikingly effective, orderly, and satisfactory, compared with what had occurred at the beginning of our other wars. The Medical Department particularly was better off than in any previous war, not only because of the help given it by this bill, but also because of

its longer established and relatively large Reserve Corps and its Red Cross units. The first contribution to the war by the United States was paid in medical officers and hospital units.

The Veterinary Corps became a part of the Medical Department, where it belongs. It belongs there not only because veterinary medicine is concerned with the treatment of disease, but because it was daily becoming closer and closer to medicine in general; it deals with the great subjects of anatomy, physiology, pathology, bacteriology, parasitology, epidemiology, and hygiene in the same way as does the medicine of humans; some of the most brilliant advances in medicine had come from the study of diseases of lower animals; many diseases are common to man and lower animals; experimental medicine deals with lower animals all of the time; inspection of foods is largely done by veterinarians, who are especially trained in it. Solution of some of the great problems of medicine, such as the cause and prevention of cancer, the control of tuberculosis, fuller knowledge of the deprivation diseases, are about as apt to come from the veterinary as from the older branch of medicine. In fact the veterinarians are of us, our brethren and fellow workers. Their entry into the Medical Department has improved their status, has helped the Medical Department in its work, and we hope for further and more far-reaching benefits from the union.

CHAPTER XI

THE CONQUEST OF DISEASES

YELLOW FEVER

AFTER the treaty of peace with Spain had defined our relation to the former Spanish colonies, Surgeon General Sternberg promoted in all ways within his power the acquisition by the Medical Corps of knowledge as to the diseases and the sanitation of our new possessions. Boards for the study of tropical diseases were established in the Philippine Islands, in Cuba, and in Porto Rico. The most notable of these, because of its complete demonstration of the means of transmission of yellow fever, was the board consisting of Major Walter Reed and three contract surgeons, Dr. James Carroll, Dr. Jesse W. Lazear, and Dr. Aristides Agramonte, appointed in May, 1900.

Walter Reed was born in Belroi, Virginia, in 1851. His schooling was somewhat interfered with by the Civil War, which lasted from his tenth well into his fourteenth year, but the interruption was less than one would expect. After the war, he attended a private school for two sessions, and at the age of sixteen, entered the University of Virginia, where, after one year of academic work, he took up the study of medicine and won his degree of M.D. in one year more, and at the early age of eighteen.

In just what degree this was due to Reed's precocity and in what to low scholastic standards, I do not attempt to say, but the fact is indicative of the narrow scope of the medical course at that time. Following his graduation from Virginia, he went to Bellevue Hospital Medical College, where he obtained another M.D. after one year's work. He became an interne in Kings County Hospital, and later entered practice in Brooklyn. Much enamored of a charming girl and too poor to marry, he tried the Army examinations as a short road to a competency, as many another has done before and since Reed's time.

He was successful in passing the examination and getting the girl, and he entered the service in 1875. For the next fifteen years he served in Western posts, doing the ordinary small round of post duties. In 1890, he was ordered to Johns Hopkins Medical School, where he came in contact with the group of geniuses whose happy fellowship made that so great a place. There he took up especially the young science of bacteriology.

In 1893, Surgeon General Sternberg established the Army Medical School and Walter Reed was detailed Professor of Bacteriology, a position which he occupied until his death.

When the Spanish-American War came, with its great epidemics of typhoid fever, Reed was one of a board, the other members being Victor C. Vaughan and Edward O. Shakespeare, to investigate that disease. The board's report was very full and threw much new light upon the epidemiology.

After the Spanish-American War, Reed was made president of the board to study the tropical diseases of Cuba, and as such he did his great work on yellow fever.

For many years Surgeon General Sternberg had himself worked at investigations of yellow fever, a large part of his work being the refutation of the mistakes of others, proof that various announced causes of the disease were not the cause.

During the year 1898 there were 1164 cases of the disease in the Army, with a mortality of 144 cases, or 12.32 per cent. In 1899 there were 262 cases, with 55 deaths. The very great majority of these cases occurred in Cuba, a few in Porto Rico and the Southern States. In 1900 a great flow of emigration from Spain to Cuba supplied non-immune material for the disease and it prevailed more extensively in the island than for some years past. A new germ, Sanarelli's *Bacillus icteroides*, had been heralded to the world as the cause of yellow fever. General Sternberg, taught caution by the many mistakes which he had had to uncover in regard to similar previous announcements, as well as by his generally scientific attitude of mind, appointed the board to investigate the subject of yellow fever generally and of Sanarelli's

bacillus in particular. The bacillus was disposed of in relatively short order. It was found in none of eighteen cases, eleven of which came to autopsy. But a happy concatenation of labors of other men speedily put the board upon the real trail of the mysterious vector which had made the disease so puzzling to the investigators of a hundred years. These important and interlinked labors were the following:

1. Ronald Ross, of the Indian Medical Service, had shown that malaria is carried by mosquitoes of the genus *Anopheles*. His work had been confirmed and elaborated in Italy.

2. The American administration in Cuba had cleaned up the city of Havana without in any way improving the yellow fever situation, thus apparently eliminating the possibility of its being a filth disease.

3. Surgeon Henry R. Carter, United States Marine Hospital Service, in May, 1900, published his very important observations on the epidemiology of the disease, especially the relation between the infecting, or imported, and the secondary cases, a relationship which, in the light of the work on malaria, pointed to an insect carrier for the disease, although Dr. Carter did not suggest this in his article.¹

4. Dr. Carlos Finlay, a resident of Cuba of Scotch and French ancestry, had nineteen years before published² the reasoning by which he had reached the conclusion that yellow fever was mosquito-borne and that it was carried by the mosquito *Culex fasciatus* (later called *Stegomyia fasciata*, *Stegomyia calopus*, *Ædes ægypti*), for twenty years had talked his belief, had been regarded as an amiable crank, and had tried, as he thought successfully, as others thought, in vain, to transmit the disease by the insect's bite. His repeated failures in themselves seemed fair proof that he was wrong. Nevertheless, he was right and his rightness is one of the finest bits of sound reasoning from correct observation

¹ Carter, Henry R.: *New Orleans Medical and Surgical Journal*, LII, No. 11, pp. 617-36, May, 1900.

² *Anales de la Real Academia de Ciencias Medicas, Fisicas y Naturales de la Habana*, XVIII (1881), 147-69.

of which there is any record in the history of medicine. A great mind — too great perhaps to mix any malice with the satisfaction which must have come when, after twenty years, his so-called folly was recognized as the most profound wisdom. Walter Reed, having these interlocking facts, was also greatly intelligent in recognizing their importance and that they interlocked. The board set itself to test out Dr. Finlay's hypothesis in the light of the work of Ross and of Carter. It was also greatly fortunate that Dr. Finlay was still living in Havana, still riding his hobby, still the object of amusement to the knowing ones, still trying to prove what his observation and reason told him was true, and still, as for years past, breeding *Stegomyia* mosquitoes and trying to transmit yellow fever by their bites. He indicated the mosquito to the board and furnished its eggs.¹

There was at the time a small epidemic of yellow fever at Quemados, and thither the board proceeded on June 25, 1900, and at once began its investigations. No inoculation experiments were made until August 11th. The first nine attempts at inoculation failed to convey the disease, because, as afterward became apparent, the mosquitoes were non-infective for one of two reasons, either (1) they had bitten the yellow fever patient too late to obtain the virus with the blood, or (2) they had not been kept sufficiently long to complete the developmental phase which the virus undergoes in the insect. It is probable that a feeling that there was nothing in Dr. Finlay's hypothesis had begun to possess the members of the board, and when Dr. Carroll was bitten on August 27th by a mosquito which had bitten a yellow fever patient in the second day of the disease and had been kept for twelve days thereafter, he apparently did not expect to get the disease. At any rate, when he became sick on the afternoon of the 29th and on the 30th, he did not take his temperature or seek a diagnosis. On the 31st, he examined his blood for malarial parasites and failed to find them, and that evening his temperature was taken for the first time and was found to be 102°. The diagnosis

¹ See *Surgeon General's Report* (1901), 181, 182.

of yellow fever was made on September 1st. The case was severe, but resulted in recovery. After the diagnosis was made, there was still no proof that he had acquired the disease from that mosquito.

The next case to develop the disease was Case II (*xy*), a soldier who accepted the bites in a spirit of disbelief and bravado. His case was diagnosed, 'well-pronounced yellow fever.' The third case, that of Dr. Jesse W. Lazear, resulted from the bite of a free mosquito in a yellow fever ward. 'On September 13, 1900 (forenoon), Dr. Lazear, while on a visit to Las Animas Hospital, and while collecting blood from yellow fever patients for study, was bitten by a *Culex* mosquito (species undetermined). As Dr. Lazear had been previously bitten by a contaminated insect without effect, he deliberately allowed this particular mosquito, which had settled on the back of his hand, to remain until it had satisfied its hunger.' In five days he sickened and in twelve days he was dead.

The board thereafter produced six more cases (all of which recovered) by mosquito inoculation, failed to produce it by most thorough experiments with fomites, and concluded:

1. The mosquito — *C. fasciatus* — serves as the intermediate host for the parasite of yellow fever.

2. Yellow fever is transmitted to the non-immune individual by means of the bite of the mosquito that has previously fed on the blood of those sick with this disease.

3. An interval of about twelve days or more after contamination appears to be necessary before the mosquito is capable of conveying the infection.

4. The bite of the mosquito at an earlier period after contamination does not appear to confer any immunity against a subsequent attack.

5. Yellow fever can also be experimentally produced by the subcutaneous injection of blood taken from the general circulation during the first and second days of this disease.

6. An attack of yellow fever, produced by the bite of the

mosquito, confers immunity against the subsequent injection of the blood of an individual suffering from the non-experimental form of this disease.

7. The period of incubation in thirteen cases of experimental yellow fever has varied from forty-one hours to five days and seventeen hours.

8. Yellow fever is not conveyed by fomites, and hence disinfection of articles of clothing, bedding, or merchandise, supposedly contaminated by contact with those sick with this disease, is unnecessary.

9. A house may be said to be infected with yellow fever only when there are present within its walls contaminated mosquitoes capable of conveying the parasite of this disease.

10. The spread of yellow fever can be most effectually controlled by measures directed to the destruction of mosquitoes and the protection of the sick against the bites of these insects.

11. While the mode of propagation of yellow fever has now been definitely determined, the specific cause of this disease remains to be discovered.¹

The board thus cleared up the question of the transmission of yellow fever, to the great glory of American medicine, the saving of thousands of lives, the advance of commerce and civilization, the rejuvenation of Latin-America, and, not least, to the eternal credit of common American manhood; the kind that enlists in the Army, the kind enlisted in the Hospital Corps. For it was the heroism — nothing less — of such men that made possible the experimentation on human beings, then the only known hosts of the disease. Carroll and Lazear were scientists, driven by the insatiable curiosity that only scientists and children know, and *xy* was a scoffer.

The enlisted men who later submitted to experiment, either with mosquito bites or the disgusting fomites of sick or dead men, were not doctors, scientists, or unbelievers; they knew the risk and they took it for no reason but the desire to do a generous

¹ *Surgeon General's Report* (1901), 200.

thing for the good of others. It was nobly generous and nobly brave. That some of them, private soldiers without other money than their small pay, accepted money when it was offered them, does not in the least detract from their heroism. That John Moran refused it then and later merely showed an admirable streak of pride in his make-up. (I cannot forbear boasting that I have known this fine man, then a clerk of the Panama Canal, modest, self-effacing, shy, and efficient.)

The world sat up and took notice of the Reed Board's report at once. Sir Patrick Manson, the foremost authority on tropical diseases then living, later described the meaning of the work in the fewest possible words:

'These experiments fully explain: 1st, the impunity with which a yellow fever patient can be visited by a non-immune if outside the endemic area; the mosquitoes in the vicinity are not infective; 2d, the danger of visiting the endemic area, especially at night; the mosquitoes there are infective and active; 3d, the discrepancy between the incubation period, three to five days, of the disease, and the incubation period, fourteen days and over, of an epidemic; the necessary evolution of the germ in the mosquitoes infected by the original introducing patient demanding the space of time indicated by the difference between these two periods; 4th, the clinging of yellow fever infection to ships, buildings, and localities; the persistence of the germ in infected mosquitoes which are known to be capable of surviving for five months, and probably longer, after feeding on blood; 5th, the high atmospheric temperature required for epidemic extension of yellow fever; such temperature favors the activities and propagation of the mosquito, and is probably necessary for the evolution of the germ in the mosquito.'

But the story is only half told, for Leonard Wood was Governor General of Cuba; he had made liberal money allowances for the prosecution of the board's work, and he gave every assistance to Major William C. Gorgas, who was then his chief sanitary officer at Havana, for the practical application of the knowledge gained.

By direction of the Military Governor an order was issued in February, 1901, changing the method of disinfection of yellow fever houses to accord with the board's findings.¹ The change involved the concentration of efforts upon the destruction of mosquitoes, the protection of yellow fever patients from the bites of mosquitoes, and the prevention of mosquito-breeding. The description of the measures to be resorted to was further elaborated in Circular No. 5, Headquarters, Department of Cuba, Havana, April 27, 1901.

Gorgas made good in every way. He reorganized his department, making anti-mosquito work its main function, and divided this work among a 'Stegomyia Brigade,' an 'Anopheles Brigade,' and a 'Yellow Fever Brigade,' the first two engaged in the reduction or prevention of mosquito-breeding, the last in the destruction of mosquitoes in infected houses and neighborhoods. The results were prompt and satisfactory. At the end of the year Dr. Finlay, chairman of the Yellow Fever Commission, was able to report that there had been but thirty-seven cases of yellow fever during the year, despite the large amount of non-immune material, and that ten of these cases were experimentally infected. In his report for 1903, dated August 19, 1903, the Surgeon General said: 'Yellow fever does not now exist in United States territory, and no case has originated in Cuba for about two years, notwithstanding that Cuba during this time has had a larger non-immune population than ever before, and that occasional cases of yellow fever have been brought to her shores from Mexican and South American ports.'

Concerning the ten experimental cases referred to by Dr. Finlay as occurring in 1901, it may be said that most of these were the result of work carried on by the Yellow Fever Commission, a body appointed in Cuba, after the Reed Board had concluded its work. It is recalled that all of the six cases of the disease produced by the Reed Board's deliberate and controlled inoculations were

¹ Gorgas, *Semi-Annual Report of Sanitary Department*. Havana, August 30, 1901.

relatively mild and resulted in recovery. It was therefore not unnatural that, by analogy with the results of inoculation for small-pox, the hope should arise that controlled inoculation by single mosquitoes might result in mild and immunizing attacks of the disease. Dr. Finlay had long believed it and Major Gorgas and Dr. John Guiteras thought it likely. Consequently the Commission established an 'Inoculation Station' and undertook the work of thus immunizing non-immunes. They produced the disease in eight cases, of which three proved fatal. One of those dying was Miss Maass, an American nurse in Las Animas Hospital. Dr. Carroll also produced six more cases, all of which recovered, but with Miss Maass's death ended the efforts to induce immunity by causing the disease.

When it was decided to dig the Panama Canal, Major Gorgas was made chief health officer, with the rank of colonel. The story of his trials and triumph in that position has already been outlined and will not be repeated or dilated upon here. Suffice it to say that he met unreasoning opposition, and serious efforts to oust him from his position were halted by President Roosevelt, who took into consideration the serious opinion of the medical profession. With quietness and humility, but with iron pertinacity, Gorgas went his way and did his work despite the stupid opposition and hindrances. He freed Panama from yellow fever and so reduced malaria and typhoid as to make the Isthmus a pleasant and safe place of residence and to make possible the successful prosecution of the canal work.

Other countries took up the work as initiated in Havana, and Rio Janeiro, the Mexican coast, our own Gulf Coast, and later Guayaquil were all freed from the disease, and for some years there was no definite outbreak of yellow fever in the Western world. Recently (1928) there has been one in Rio Janeiro, probably the result of neglect arising from too great a sense of security. It can and will be controlled and it may teach valuable lessons. The disease still exists in Africa and the causative germ is still being sought. Within a short period prior to this writing four

investigators have there succumbed to yellow fever contracted accidentally in the course of their work. But the abolition of the disease from civilized America for years is proof of human mastery of it and its days on earth appear to be numbered.

MALARIA

As stated earlier, malaria was proved mosquito-borne before yellow fever. Ronald Ross, who showed the facts, also applied them on a relatively small scale to the reduction of the disease, as did some of the Italians, but again it was the Americans who gave the largest demonstration. From 1898 onward our troops were instructed to use mosquito nets and otherwise to avoid infection, but Gorgas's work in Havana was directed mainly to the prevention of mosquito-breeding. In the same period during which yellow fever was being abolished from that city, its malaria-incidence rate was reduced three fourths. Later, in Panama, the same thing occurred. There are excellent reasons why malaria is not so readily controlled as yellow fever, the most important being, (1) most *Anopheles* mosquitoes are not domestic in their habits and their breeding is not nearly so easily controlled or prevented as is that of *Stegomyia*, and (2) the malarial patient, instead of being capable of giving the infection to mosquitoes for three days only, as is the yellow fever patient, is dangerous for weeks, months, or years. Malaria patients are also much more numerous than yellow fever patients. But the work has gone on, not only in Panama, but also in our Southern States, in the Philippines, and elsewhere. In 1901, the incidence of malaria in the Army was 708.52 per 1000; in 1902, 272.30; in 1907, 63.19; in 1926 it was 8.18, and for American troops in the Philippine Islands 14.87 per 1000, in Panama 80.91. In 1927 the rate was 6.73 for the entire Army, 13.14 in the Philippines and 42.90 in Panama. The Panama figures are not quoted boastfully, as they are much higher than those for Canal employees. The control of malaria in the Army was not the work of one man. It was the independent but correlated work of hundreds of officers in all of

the posts. One man does, however, deserve credit for his extensive investigations, writings, and advice in regard to the disease. Colonel Charles F. Craig has written upon the subjects of malaria and amœbic dysentery from the time of the Spanish-American War, is an authority on both, and the Army is indebted to him for much advanced information through the years in regard to both.

PLAGUE

Another insect-borne disease with which the Army came into early contact in the Philippine Islands was plague. The first important American studies in regard to this disease were made by an Army board appointed in the Philippine Islands, consisting of Lieutenants R. P. Strong and W. J. Calvert and Acting Assistant Surgeon Joseph J. Curry, assisted by Dr. W. E. Musgrave, Hospital Steward. This board issued a circular upon the subject of plague in February, 1901, a time when the disease had gained an extensive foothold in Manila, which was of classical excellence for the day. The agency of the flea in the transmission of the disease and the excellent work of the Indian Plague Commission had not yet appeared. It is to be noted, however, that plague was kept out of the Army and the epidemic in Manila controlled by Army medical officers.

It is also to be noted, but with regret, that all of the promising young men composing the board mentioned left the service by resignation, although two of them, Strong and Musgrave, remained in the Philippines for many years and were chief among those who built up the excellent Bureau of Science and the Medical School in Manila, and made the city a medical center in the Far East.

DYSENTERY

Among the great plagues of our Army in all its wars prior to the World War, and, after malaria, chief of the ills which afflicted it in the tropics, was dysentery. By 1900, Craig was writing of amœbic dysentery as observed in the General Hospital at the

Presidio of San Francisco, and Strong and Musgrave sent a report on both bacillary and amœbic dysentery in the Philippines, which was comparable, in the fulness and excellence of the material presented and the work done, to the circular already cited in regard to plague. The Army admission rate for dysentery in 1900 was 145.13 per 1000; in 1901 it was 82.65; in 1902, 62.03; 1907, 18.09; 1926, for the entire army, 0.02; for American troops in the Philippines, 0.24.

CHOLERA

Cholera was one of the early subjects to engage the attention of the Army and of the Tropical Board in Manila. Lying so close to the great regions in which the disease is endemic, China and India, and trading extensively with both, the Philippines were readily subject to infection. The spread of this was promoted by the personal habits and manners of life of the people. On March 20, 1902, two cases suggestive of cholera were reported from San Juan de Dios Hospital in Manila. While the Tropical Board was investigating these cases, two others were reported. Orders were at once issued warning all medical officers of the necessity of special measures to protect troops. The disease spread rapidly into the provinces. By May 15th there had been 1005 cases with 800 deaths in Manila, and 3210 cases with 2522 deaths had been reported from the provinces. The natives disobeyed regulations, failed to report and concealed cases and deaths, and in many ways acted in such a manner as to promote spread of the disease. In his Report for 1903, the Surgeon General quoted, as probably underestimated, a statement that in 1902 there had been 128,000 cases, with 81,500 deaths, among natives. In 1904, the Commissioner of Health reported that the total number of cases reported from March 20, 1902, to March 23, 1904, when the epidemic was declared ended, was 166,252; the number of deaths, 109,461. In Manila the cases reported numbered 5581; the deaths, 4386. The control measures were severe and entailed much inconvenience and economic loss. This fact, the numerous detected violations

of the regulations, and the mortality rates all indicate that the number of cases reported was much smaller than the number which occurred. Colonel L. M. Maus, who was the Commissioner of Health at the time, has expressed the opinion that there may have been 300,000 cases. It seems probable. The number of cases developing in the Army in 1902 was 485, with 286 deaths. In 1903 it was 149, with 96 deaths; in 1904, one case, no death. The Commissioner of Health was an Army medical officer and he called upon the Chief Surgeon for other medical officers to help him. Thirty-one were detailed to the duty in Manila and medical officers throughout the islands were made members of the boards of health and sanitary officers of the towns in which they were stationed. Considering the conditions obtaining, the prompt control of an epidemic so widespread was a high accomplishment and one reflecting great credit upon the Corps.¹

ANCYLOSTOMIASIS

Lieutenant Bailey K. Ashford, Medical Corps (now colonel, retired), in 1899 began the study of 'Porto Rican anæmia' or 'tropical chlorosis,' and very soon determined that it was due to infection with the hookworm, or *Ancylostoma*, also called *Uncinaria* and *Necator*, and in 1900 he forwarded an interesting report upon the subject, which was printed in the Surgeon General's Report for that year. Ashford called attention to the extensive prevalence of the disease and concluded his first report with these words: 'I will not lengthen this paper by any description of a parasite so well known and so fully described by the professor of helminthology at the Army Medical School, nor will I make further remark on the history of the disease, its evident prophylaxis and simple cure, until I can call to my aid a more extensive familiarity with it.' This quotation indicates that Professor Charles Wardell Stiles had taught Ashford, who graduated from the Army Medical School in 1898, in regard to the hookworm, but that fact does not lessen Ashford's credit in re-

¹ See Appendix 5.

cognizing its great importance in regard to the public health of Porto Rico. As the result of Ashford's findings and recommendation a campaign against the parasite was inaugurated, people were treated by tens of thousands and the inhabitants of Porto Rico were given an opportunity to grow, to work, and to live in health. This was a great accomplishment in medicine and national hygiene. So successful was Ashford's work that it has found application in many countries. Though less dramatic, it is worthy to be mentioned with the work of Gorgas, and it should be known to all medical officers.

SMALLPOX

When American troops entered Manila they found a statue in honor of the man who had introduced vaccination to the Philippines in Jenner's day. But, as in Spanish America, in fact as in the United States to a large extent, the practice had been neglected. Smallpox was endemic and exceedingly common in both the Philippines and Porto Rico, a large proportion of the populations bore the marks of the disease, and exposure to infection in streets, in public places, and conveyances was a daily possibility. Major John Van R. Hoff, as Chief Surgeon of the Porto Rican command, and Colonel Maus, as Commissioner of Health in Manila, undertook enormous campaigns of vaccination, each involving millions of people, and each followed in due course by the elimination of smallpox. The results were sooner attained and more striking in Porto Rico because the problem was smaller and peaceful conditions permitted the systematic pursuit of the work. Insurrection in the Philippines hindered and delayed it. Another oppressing plague was removed, many thousands of lives saved, and suffering and disfigurement averted from many more thousands of people.

TYPHOID FEVER

The unhappy memories of the Spanish-American War are largely related to typhoid fever. This disease has been mentioned

and discussed in preceding chapters. In the period now under discussion it was practically eliminated from the Army and a presentation of some facts relating to it is indicated. In his Annual Report for 1908, Surgeon General O'Reilly reported for the previous year the lowest admission rate for typhoid ever recorded up to that time. He also said (page 17): 'In time of war the difficulties in the way of controlling the factors concerned in the spread of the disease become so great that some foreign armies are endeavoring to render their soldiers immune to typhoid by means of antityphoid inoculation. A considerable measure of success has attended experiments along the line, and this office is now carefully investigating the matter to see if the method can be applied to advantage in our service.' During the summer of that year, 'Major F. F. Russell, Medical Corps, was sent to Europe to make a study of the methods in use in England for the stamping out of typhoid fever epidemics, both in the army and among the civilian population.' Major Russell submitted a report which the Surgeon General described as 'a very valuable treatise on the epidemiology of this disease up to date.' A board consisting of the Surgeon General, the following members of the Medical Reserve Corps, Dr. Victor C. Vaughan, Dr. William F. Councilman, Dr. John H. Musser, Dr. Alexander Lambert, Dr. Simon Flexner, Dr. William S. Thayer, and Major Russell as recorder, was convened. 'The board proceeded to review the history of vaccination as a method of protecting troops against typhoid fever. The experience of both the English and the German armies was considered.' The board reached the following conclusions:

'I. The board is convinced that the practice of anti-typhoid vaccination is both useful and harmless and that it offers a practicable means of diminishing the amount of typhoid fever in the Army both in times of peace and war.

'II. It finds that the experience to date with the anti-typhoid vaccination justifies it in recommending the introduction of the practice in the Regular and Volunteer armies in time of war.

'III. It recommends the immediate introduction of the prac-

tice of voluntary vaccination against typhoid in the Hospital Corps, the Army Nurse Corps, and in any expedition of troops from the Regular Army which is ordered to take the field for active operations: and, further, that an opportunity be given to volunteers from the army as a whole to be protected by vaccination against typhoid.’¹

The findings and recommendations of the board were approved by the War Department and published in G.O. 10, 1909. By the end of February, 1909, vaccine was ready for issue, and instructions for its administration were sent out. The Surgeon General’s Report for 1909 showed that it had then been given to 830 individuals.

Of very great importance also in the control of typhoid fever were the following instructions which were sent to all post surgeons and which practically ended the production of typhoid carriers, whose existence was then first officially recognized in the Army:

‘In all cases of fever which possibly may be typhoid, and in which the diagnosis is in doubt, specimens of blood should be sent promptly by mail to the nearest laboratory with request for a bacteriological diagnosis. Experience has shown that the diagnosis of typhoid fever may be made by blood cultures much sooner and with greater certainty than by the Widal test.

‘Specimens of feces and urine from suspected typhoid carriers should also be sent to the laboratory for examination and report.

‘Hereafter no case convalescing from typhoid fever will be returned to duty until three negative reports on samples of urine and feces, collected at six-day intervals, have been made.

‘Every case of typhoid, or suspected typhoid, at a post will be reported at once by information slip to the chief surgeon of the department and a duplicate sent to the Surgeon General.

‘Any typhoid patient who is not suffering from a relapse, and who continues to excrete typhoid bacilli after ten weeks from the

¹ *Surgeon General’s Report* (1909), 44-51.

beginning of his fever, should be reported to the chief surgeon of the department.

'Suitable containers for urine, feces, and blood for the tests, with full directions for collecting the same, may be obtained from the nearest of the designated laboratories.

'Besides investigations connected with typhoid fever, these laboratories will also, upon request, conduct other bacteriological investigations connected with infectious diseases.'

In this year also, for the first time, a company epidemic was attributed to contamination of food by a carrier. The incidence of the disease in the Army was again the lowest of record. During the calendar year 1910, 16,093 persons were given the typhoid vaccine and in the first six months of 1911, 27,720 more received it. As mentioned in an earlier chapter, a division of troops was mobilized in Texas and a brigade in Southern California in the spring of 1911; all were given the prophylactic, but three cases of typhoid occurred and the prophylaxis was established in popular favor.

It was made generally compulsory in 1911, and as typhoid disappeared from the Army very rapidly thereafter, it was given credit by many medical officers for all of the improvement. This it probably did not deserve, as the following factors in combination may have been of quite as great importance.¹

1. The lessened introduction of the disease. Whereas in 1898, one half of the regiments took typhoid fever to camp with them, there were in 1911 but two cases introduced into the division in the Texas camp, and but one into the brigade in Southern California.

2. Lessened opportunity to spread. The disease spread in every camp into which it was introduced in 1898, mainly because the disease was often undiagnosed, never early.

¹ This statement must not be considered derogatory of the great work done by Colonel F. F. Russell, one of the ablest scientific men in the Medical Corps. His resignation to go to the Rockefeller Foundation was a great loss to the Army. His knowledge of typhoid and of epidemiology in general doubtless enabled him to value more truly all factors concerned in the reduction of typhoid than could men less well informed.

3. Education in hygiene of line officers and men. The line officer of 1911 had at his disposal more information on the epidemiology of typhoid than had the medical officer of 1898, and he had been trained to use it.

4. The recognition of the danger of carriers and sick men in kitchens. It is notable that in all typhoid epidemics recorded in the Surgeon General's Reports prior to 1909 kitchen infection was not mentioned once. Beginning in 1909 it was always considered thereafter. Epidemics in companies are more often attributable to it than to any other single cause.

5. The examination of convalescents as to their carrier state and the detention of carriers in hospital.

6. The control of fly breeding and fly contamination by better camp police, the use of crude petroleum in latrines, and the use of the Harvard box latrine-seat.

7. The chlorine purification of water supplies.

8. Improved methods of investigation of epidemics.

One of the reasons for suggesting that these factors combined may have been as important as the vaccination is found in the following figures of typhoid deaths per 1000 in the Army with vaccination and in Panama Canal employees without vaccination:¹

	EMPLOYEES	ARMY
1907.....	2.49	0.79
1908.....	.43	0.31
1909.....	.27	0.25
1910.....	.25	0.17
1911.....	.20	0.19
1912.....	.08	0.02
1913.....	.07	0.00
1914.....	.09	0.01
1915.....	.05	.00

Another reason is found in the decline in typhoid in the civil communities, the death rate per 100,000 in 57 cities with 20,000,000 people falling from 19.59 in 1910 to 6.23 in 1918. Still

¹ The writer left Panama in 1915 and does not know how extensively vaccination was used thereafter.

another is found in the reduction of incidence of diarrhœa and dysentery in the Army, along with typhoid, as shown in a preceding section of this chapter, and by the following:

	CASE RATE PER 1000 IN		
	1861-62	1898-99	1917-18
Typhoid and typhus.....	{ 70.69	{ 91.22	{ 0.34
Typho-malaria.....	{ 41.84	{ ..	{ ..
Fevers, undetermined.....		{ 27.00	{ 5.93
Diarrhœa, dysentery and intestinal diseases.....	876.78	402.11	34.48
	DEATH RATE PER 1000 IN		
	1861-62	1898-99	
Typhoid and typhus.....	{ 19.61	{ 9.67	{ .05
Typho-malaria.....	{ .94	{ ..	{ ..
Diarrhœa, dysentery and intestinal disease.....	10.37	1.93	.08

In one way and another our Army conquered typhoid and, less completely, diarrhœa and dysentery — ancient foes which had often worsted it, and the conquest was apparently for all time. So far as American military efficiency is concerned, this is a greater event than the control of yellow fever.

The Medical Corps has no greater accomplishment to its credit, no greater evidence of worth.

BERI-BERI

When we took possession of the Philippines, we encountered a disease unknown to American doctors at that time, but much too familiar in the Orient, the same disease which was the leading cause of sickness among the Japanese troops in the war with Russia. That disease was beri-beri, a peculiar peripheral neuritis, with pains and other alterations of sensation, paralysis, wasting, marked disturbance of the heart, and, in many cases, dropsy. When we imprisoned insurgents they were very likely to develop the disease and many died of it. During the winter of 1901 there were more than 2000 cases of it in Bilibid Prison in Manila, and in the six months ending May 31, 1902, there were 2470 cases with 77 deaths.¹ When we organized Philippine Scouts and Con-

¹ *Report, Philippine Commission* (1902), 346.

stabulary they were seriously afflicted by it. English, Dutch, and French physicians in the Far East had studied it. The Japanese had freed their navy from it after changing the ration of the men. There was much evidence that it was related to a diet consisting mainly of rice, and much that the rice related to it was the highly milled white rice, that from which the pericarp was removed in the milling process. In 1909, upon the recommendation of the Board for the Study of Tropical Diseases, then consisting of Captain James M. Phalen and Captain Edwin D. Kilbourne,¹ the ration for the Filipino Scouts was changed by the substitution of undermilled for highly milled rice, a reduction of the amount of rice from twenty to sixteen ounces, the substitution of 1.6 ounces of beans for the four ounces of rice taken away. In addition, savings on the meat component of the ration were forbidden. Other changes were made in the next year and a half, until in June, 1911, the ration was back to what it was in the first half of 1909, except that the rice remained at sixteen ounces of undermilled and beans (mongoes) were added. Beri-beri underwent a sharp decrease, the admissions of Scouts falling from 604 in 1909 to 50 in 1910 and 2 in 1911, and it has been absent or nearly so ever since. Several members of the Tropical Board worked on this subject, but Captain (now Colonel) E. B. Vedder made it almost his personal property by his prolonged and careful investigations through many years and by the excellent book which he wrote upon it and which took the Cartwright Prize in 1913.²

Following the Scout experience, similar changes (the use of undermilled rice and mongoes) were made in the rations of the Philippine Constabulary, the leper colony at Culion, Bilibid Prison, and other public institutions, always with satisfactory results in the abolition of beri-beri, and that disease is commonly cited as a typical avitaminosis. That it is always purely such is doubted by some workers. That it was controlled in the

¹ *Surgeon General's Report*, 1911, page 127.

² In connection with Vedder's name it may here be mentioned that his work with emetine was the first step toward the now widespread hypodermic use of its salt in the treatment of amœbic dysentery and its complications. He has also worked and written on many other subjects.

Philippines by measures based on that hypothesis admits of no doubt.

DENGUE

As has been noted in the first part of this history, dengue, breakbone fever, or *scarlatina rheumatica* was recognized and described in the Army a century ago. Benjamin Rush described it as 'bilious remittent fever,' and under that name it was commonly confused by him and others with yellow fever and malaria. Through all the intervening century it has attacked our troops in Southern stations at intervals, usually attacking and temporarily disabling a considerable proportion of a command. Although rarely fatal, it caused a good deal of suffering. It prevails in our tropical possessions. When Surgeon General O'Reilly in 1906 reconstituted the Board for the Study of Tropical Diseases in Manila, the first board having ceased to exist when its members left the Army, his letter of instructions contained the direction that 'the specific cause of dengue should be sought for and its alleged conveyance by the mosquito be confirmed or disproved.' The board had an early opportunity for work on an extensive epidemic of the disease at Fort McKinley, near Manila. It rendered a report which described the epidemiology and semeiology of the disease, proved it due to a filterable virus, incriminated the mosquito, and reported the experimental transmission of the disease by the bite of *Culex fatigans*. This last was apparently an error and was probably due to accidental infection of the individual experimented upon, as later work in Australia, and very excellent work by a later Tropical Board,¹ showed that the vector is *Aedes*. This was particularly interesting in view of the sometimes fairly extensive prevalence of dengue in the Canal Zone, there described by Deeks² as six-day fever. Its existence there afforded additional

¹ Siler, J. F., Hall, M. W., Hitchens, A. P.: *Journal of the American Medical Association*, April 18, 1925. Also, *Dengue*. Manila, Bureau of Printing, 8°, 476, 1926.

² Deeks, W. E.: *Six-Day Fever in Panama*. Association of Tropical Medicine and Parasitology (Liverpool, 1914-15), VIII, 357.

evidence of the fact that the elimination of a mosquito-borne disease (in this case yellow fever) does not necessitate the destruction of all insect carriers, if only the remaining ones are kept from acquiring the infection.

As a result of the work of the Tropical Boards the etiology, conveyance, epidemiology, semeiology, prevention, and control of dengue are as well understood as those of yellow fever, which they much resemble in all respects except the severity of the disease and the less constant and persistent immunity conferred by an attack.

VENEREAL DISEASES

So long as venereal diseases have been known they have shown a predilection for the military environment, for the reason that the soldier is usually a young unmarried male removed from contact with his own women kind, and usually from the home environment and opinion which would be most apt to keep him in conventional paths. Herodotus relates that while Cyaxares, ruler of the Medes and Persians, was besieging Nineveh, a great army of Scythians came upon him by a way which left Mount Caucasus upon the right, and defeated him. They went on toward Egypt until Psammiticus by presents and prayers diverted them from going farther. 'In their return, however, they came to Ascalon, a city of Syria, and when most of them had marched through without doing any injury, some few who were left behind pillaged the temple of Celestial Venus. This temple is the most ancient of all the temples dedicated to this goddess. . . . However, the goddess inflicted on the Scythians who robbed her temple at Ascalon, and on all their posterity, a female disease: so that the Scythians confess they are afflicted with it on this account.'

Celestial Venus has been as severe upon American despoilers of her virgins as upon the Scythians. For long years our Army had higher venereal rates than had most of the armies of Europe, a fact which gave us a choice between acknowledgment that our

people were not more virtuous than the rest of the world or that they were less intelligent. As either conclusion would have been humiliating, both were ignored. At the time of the World War and since, unusual efforts were made to prevent and reduce venereal disease in the Army. One measure which was and is much lauded (medical prophylaxis or early treatment) has been given far too much credit for the reduction which has occurred. It is used after a very small proportion of illicit sexual contacts. As to the real causes of the reduction, only speculation, not proof, is possible, but the virtual abolition of police-controlled, commercial prostitution is thought an important factor. Reduction has been great. In 1903 the Surgeon General wrote: 'The steadily increasing prevalence of venereal disease is the most discouraging feature of the sick report of the Army. During 1902, 13,000 admissions were from this cause alone, equivalent to a rate of 160.94 per thousand.' In 1917 the rate was 122.62; in 1927 it was 49.73.

RHEUMATIC FEVER

For the decade 1891 to 1900 the admission rate for rheumatic fever was 5.28 per 1000; in 1902 it was 5.22; in 1926, 0.53. To what extent the Dental Corps is responsible for this reduction, to what extent the 'tonsil-snatchers,' and to what extent other agencies is not known. The reduction of 90 per cent in a quarter-century is most welcome. Suffering, non-effectiveness, and valvular heart disease, with its train of invalidism and death, have all been reduced. The total benefit to the Army is very great, but it came so quietly, with so little publicity, that there is nothing but the welcome fact to chronicle.

Excellent work has been done on Malta fever, but there has been no conquest of it, as it has always been a rare disease in our Army. Lieutenant Walter Cox, Medical Corps, first described it in the Army in 1898. Strong and Musgrave studied it in Manila, Captain Ernest R. Gentry and Thomas L. Ferenbaugh in 1911

showed it to be endemic in our Southwest, and Gentry has more recently done good work on the closely related, if not identical, *Bacillus abortus* infection.

SICKNESS AND DEATH RATES

For the decade 1891-1900 — Rates per 1000 of strength:

Admissions for disease.....	1489.44
Admissions from all causes.....	1710.43
Deaths from disease.....	10.45
Deaths from all causes.....	14.78

For the year 1903:

Admissions from disease.....	1514.29
Admissions from all causes.....	1716.51
Deaths from disease.....	12.78
Deaths from all causes.....	15.49

For the year 1926:

Admissions from disease.....	561.86
Admissions from all causes.....	687.22
Deaths from disease.....	2.27
Deaths from all causes.....	3.94

For the year 1927:

Admissions from disease.....	526.78
Admissions from all causes.....	644.24
Deaths from disease.....	2.35
Deaths from all causes.....	4.00

‘All of which I saw, and part of which I was.’

CHAPTER XII

THE SURGEON GENERALS

SURGEON GENERAL GEORGE M. STERNBERG retired for age in 1902. His work in the Army has been discussed in preceding chapters. It remains to be added that he entered the service in May, 1861, was taken prisoner at first Bull Run because he refused to leave the wounded for whom he was caring, and was officially commended for his conduct at the battles of Gaines's Mill and Malvern Hill. After the close of the Civil War, he served in various posts in the West, lost his first wife from cholera, participated in Indian campaigns, notably the Nez Percé campaign, and contracted yellow fever at Pensacola.

He was early attracted to bacteriology and was the outstanding American pioneer in the subject, a prolific worker and writer, a leader in public health work. He did much for the Medical Corps and was one of its most distinguished members. Surgeon General at the time of the Spanish-American War, he did what he could personally do under the unfortunate circumstances, but he was not a great organizer; did not know how to shift work to others, and so free himself from harassing details. His scientific attainments did not aid him in the administration of his suddenly expanded job. He was also part of an obsolete and incompetent system. No man could have held the position at that time and have come through the war in it with more respect than did Sternberg. His life was filled with good work and high honors. He was granted honorary degrees from great schools, was honorary member of learned societies in Europe and South America, president of the American Medical Association, American Public Health Association, and other scientific organizations. He was learned, gentle, philanthropic, and kind, and his memory is held in affection, as well as in honor and admiration. He died November 3, 1915, full of years and honors.

He was succeeded by William H. Forwood, who had also entered the service in 1861. He took part in numerous engagements, including Yorktown, Gaines's Mill, Malvern Hill, second Bull Run, Antietam, Gettysburg, and Brandy Station. His horse was killed under him at Fairfield, and he was shot through the right breast at Brandy Station. After the war he served in many Western posts, and became one of the notable operating surgeons of the Army before the Spanish-American War. He was in charge of the medical work at Montauk Point, as already related. He was Surgeon General but three months, his appointment being honorary. His accomplishments in the office were necessarily small.

Robert M. O'Reilly became Surgeon General upon the retirement of General Forwood. He was the senior officer who had four years of service before him and he had behind him a fine, if not greatly distinguished record. He was also a man of fine mind and great culture and a very delightful person. He had entered the Army in 1864 as a medical cadet. At the close of the war he resumed his medical studies and obtained his degree from the University of Pennsylvania. He reentered the service as an assistant surgeon in May, 1867. During Mr. Cleveland's two administrations, O'Reilly was his personal physician and was also attending surgeon in Washington, where his culture, skill, and personality made him widely known. When he became Surgeon General, he departed from the long-time custom of the service, and, instead of surrounding himself with men of his own age and length of service, he brought in young, alert, active men, choosing wisely and well, and had about him a group with whose aid he was able to accomplish great things for the Medical Corps and for the service. All of those men were devoted to him and they still speak of the 'Little Chief' with accents of true affection. First of them, and executive officer in the organization, was Jefferson R. Kean, one of the far-seeing and long-planning men of the Corps, to whose foresight and plans, more than to those of any other man, we are indebted for the Medical Reserve Corps, the close liaison with the Red Cross, and the Red Cross Hospital

Units of the World War, and who was prominent in all the developments of the Corps during the administration of Surgeon Generals O'Reilly and Torney. Kean himself twice came close to appointment to the surgeon generalcy and those who know him best believe that he would have made a very able head for the department. Another man of O'Reilly's official family was Walter D. McCaw, whose good sense, good humor, and great learning made him a very valuable counselor. Youngest of the group was Merritte W. Ireland, the present Surgeon General. He was given charge of Hospital Corps affairs, and later was made personnel officer, the first the office had had in many years. Before that the chief clerk made assignments of medical officers, and the medical officer who sought favors was apt to cultivate the chief clerk. This gentleman did not surrender his prerogatives without a struggle, but he did surrender. Ireland made records of the services and stations of all officers, established a foreign-service roster and put order and relative justice into assignments. He also there laid the foundation of the remarkable knowledge of the members of the Corps which has since characterized him so strongly.

General O'Reilly sent Captain Carl R. Darnall to duty at the Army Medical School, where he later became Professor of Chemistry. He took an early interest in water purification in the field, devised the Darnall filter, which was extensively used until displaced by chlorine purification of water, in which also Darnall was a pioneer. In addition to his school duties, he was put in charge of the Field Medical Supply Depot when this was established, and from that he entered upon his career of medical supply work, in which he did so much to prepare the Medical Department for its early entry into World War activity.

General O'Reilly was a Catholic and the names Kean and Ireland were those of distinguished Catholic prelates. The reorganization of the office put some noses out of joint and rumors of a tight corporation in control of the Surgeon General's office spread through the Corps. Kean, McCaw, Darnall, and Ireland,

no one of them Catholic, became known as O'Reilly's 'Catholic clique,' which constituted a bogey for the type of mind which later blossomed in the K.K.K. Inasmuch as James D. Glennan, Francis A. Winter, Charles Lynch, and Charles F. Mason, two of whom were Catholics and the others had names that might have belonged to Catholics, were later taken to Washington, and as General Torney was a Catholic, the legend grew, and it is possible that there are still people who believe that the Pope of Rome has the appointment of the Surgeon General of the United States Army, which would be amusing if it were not sad. These men shared in the forward-looking work initiated by General O'Reilly, and as they or part of them have been in the office almost constantly since that early day, there has been a continuity of policy which has been of great benefit to the service.

General O'Reilly and they were meanwhile busy. They got in touch with the Army, with Congress, with the medical profession, and the public. They took the Dodge Commission's Report as a 'charter'; from the first they saw the advantages of the General Staff, and they played the game fairly and enthusiastically, to the advantage of the Medical Department and the service. Every Medical Department activity was examined, overhauled, and improved. In the last Annual Report which he submitted, that for 1908, Surgeon General O'Reilly was able to and did enumerate the findings of the Dodge Commission in regard to the Medical Department and to show what had been done in regard to them during his administration. The following excerpts are from that Report:

'The following are the recommendations of the Commission:
"What is needed by the Medical Department of the future is:

"(1) A larger force of commissioned medical officers."

'... This first recommendation has been the most difficult of execution and the last of all to reach accomplishment in the bill signed by the President on April 23d of this year. . . . This act, besides increasing the corps by 32 per cent, corrected the disproportionate number in the lower grades which had been intro-

duced into the reorganization in 1901. . . . It also substituted a medical reserve corps, members of which are commissioned after examination, but called into service only when needed, for the objectionable device of employing civilian physicians under contract. . . .

“(2) Authority to establish in time of war a proper volunteer hospital corps. . . .”

‘An ample and well-organized hospital corps is a feature of the organization prepared by the General Staff as a model for the next volunteer army. . . .’

“(3) A reserve corps of selected trained women nurses ready to serve whenever necessity shall arise. . . .”

‘This has been carried out by the organization of the Army Nurses’ Reserve Corps, which was created in 1901 along the exact lines proposed.

“(4) A year’s supply for an army of at least four times the actual strength, of all such medicines, hospital furniture and stores as are not materially damaged by keeping, to be held constantly on hand in the medical supply depots. . . .”

‘A study of this question and of the evidence as to what was lacking in the way of supplies in the hospitals of the Volunteer Army made it evident that the majority of articles of medical supply can always be obtained in the markets of the United States in sufficient quantity, and the shortage at the time of the Spanish War was in the main a defect of transportation and distribution. Every article on the supply table was looked up to determine the available supply procurable immediately or within thirty days, and an estimate made of the amount needed for armies of various sizes. The sources of supply were also investigated. Medical and hospital supplies were thus divided into two classes, of which the first and largest could always be obtained in the United States in sufficient amount, they being the drugs and supplies habitually used by the medical profession. The second list comprised those articles — chiefly field chests and medical supplies and equipment for field use — which are intended to meet special requirements

and are not kept in stock by the trade. Of these a reserve supply for war was evidently needed, it having been found that the field chests ordered at the beginning of the Spanish-American War were not delivered by the contractors until after its close.

'A beginning had already been made to collect field equipment, and a depot had been established in the basement of the Army Medical Museum and Library building. This depot has been moved into a more commodious and suitable building and the reserve supply has been year by year enlarged and amplified. Medical storehouses for field equipment have also been secured at the old powder depot at St. Louis, where a second field depot has been established. A store of field equipment has been assembled at the medical supply depot at San Francisco and at Manila. A systematic plan for the assembling of field hospitals, complete with ordnance and all quartermaster's supplies, except transportation, but including tentage, has been instituted. These are complete with the exception of a few articles, such as rubber goods, which deteriorate from storage. They can be supplied and the hospitals be ready for shipment in twenty-four hours. Two base hospitals, ten stationary hospitals, thirty-eight field hospitals, seventy-eight regimental hospitals, and seven supply depots are now assembled or in process of assembly at Washington, St. Louis, San Francisco, and Manila.

'The liberality of the present Congress in appropriating a fifth of a million dollars for this special purpose will very considerably increase the provision of reserve field equipments.

“(5) The charge of transportation to such an extent as will secure prompt shipment and ready delivery of all medical supplies.”

“... The Medical Department has now, by paragraph 638, F.S.R., entire control of the wagons, trains, vessels, etc., turned over to it, and it has the privilege of shipping by express when this mode of rapid transportation is deemed necessary and is feasible. It being recognized that it is impossible for the Medical

Department and other staff departments to have each a distinct quartermaster service of its own, provision has been made in the Field Service Regulations for the appointment of acting quartermasters for medical organizations and for the detail of representatives of the Medical Department to accompany shipments when necessary *en route*. In the extensive shipments made by this department to San Francisco at the time of the earthquake and fire in that city, the medical supplies sent in carload lots or by special trains were accompanied by Hospital Corps detachments, and in the case of trains of medical supplies, by medical officers, and all of these arrived with the utmost promptness. In the case of medical supply trains the officers in command were able to pick up *en route* a large number of cars of quartermaster's supplies found on the sidings by the way, which were also delivered promptly in San Francisco. It is believed that these provisions give as much autonomy in the question of transportation of supplies as is practicable or necessary, and that the Medical Department will, like other staff and supply departments, have to look for any further relief to improvements in the organization and methods of the transportation branch of the Quartermaster's Department upon which they must all depend.

“(6) The simplification of administrative ‘paper work,’ so that medical officers may be able to more thoroughly discharge their sanitary and strictly medical duties.”

‘The whole matter of reports, returns, etc., required of medical officers in garrison or in the field has been made the subject of careful study to reduce to the minimum permitted by the law and Treasury regulations, the “red tape” which is so burdensome to the volunteer medical officer.

‘An extension of the card system to the posts has saved the recopying of the reports of sick and wounded in this office and made possible a considerable reduction of clerical force.

‘A careful study extending over nine months was made of the organization of the Surgeon General's Office with a view of remedying certain administrative defects which had long been

evident. It was found that the work was neither evenly nor logically distributed among the assistants and a vast amount of detail was brought to the chief of the bureau which could be properly and logically transacted by his assistants. This interfered with proper attention to larger affairs and in time of war caused a congestion at the top which was fatal to administrative efficiency. A reorganization of the office was made with a redistribution of the work among the several divisions, which has much facilitated the transaction of current business and made it readily possible to expand the office in war without any rearrangement or confusion, leaving the Surgeon General free from routine matters or administrative details, so that his time may be given to large affairs. Incidentally to this reorganization, rosters of all medical officers have been made out so as to show their stations from entry into service and their proper order for foreign service. It is now possible as a rule to notify officers several months in advance that their turn for foreign service has arrived, and the number of changes of station in the United States has, by foreseeing moves, been constantly reduced with economy alike to the Government and the medical officer.

“(7) The securing of such legislation as will authorize all surgeons in medical charge of troops, hospitals, transports, trains, and independent commands to draw from the subsistence department funds for the purchase of such articles of diet as may be necessary to the proper treatment of soldiers too sick to use the army ration. This is to take the place of all commutation of rations to the sick now authorized. Convalescent soldiers traveling on furlough should be furnished transportation, sleeping berths or staterooms, and \$1.50 per diem for subsistence in lieu of rations, the soldier not to be held accountable or chargeable for this amount.”

‘The recommendations under this head have been carried out practically as suggested by the Commission. It is seen, therefore, that in so far as the Dodge Commission was able to formulate the defects existing in the Medical Department, these have been

corrected. The work of improvement has not, however, been limited to these recommendations.

'Medical supplies. The non-expendable medical supplies on hand were to a very large extent obsolete or unsatisfactory. Many of the instruments in the post hospitals had come down from the time of the Civil War and the pre-antiseptic era, while the field equipment was necessarily purchased in haste wherever it could be found at the time of the Spanish war and was defective in quality and design. A study of this equipment was made, and all of it which was obsolete or unsuitable was condemned.

'The Hospital Corps has been reorganized by the act approved March 3, 1903, and a thorough system of instruction for its members of all grades put in operation. The result has been a very gratifying increase in its efficiency.

'At the maneuver camps of 1906, and upon the recommendation of this office, sanitary squads were first organized and used to perform all the sanitary work of the camp, such as the purification of water, the disposal of wastes, destruction of mosquitoes, etc. These squads were composed of Hospital Corps men and hired civilians working under the direction of the sanitary inspector; their work was most satisfactory both to line and staff, and it is believed that this organization marks the beginning of the use of the Medical Department for more extended executive sanitary functions.

'The war with Spain and the wars in South Africa and Manchuria attracted general attention to the importance of diffusing a knowledge of sanitation, not only in the medical staff, but among officers of the line as well, and accordingly by General Orders No. 176, October 21, 1905, a department of military hygiene was established at the United States Military Academy, the senior medical officer at the Academy being made the head of the department and a member of the academic board.

'The method of examination of candidates for admission to the Medical Corps has been changed so as to require their graduation at the Army Medical School before being commissioned. In this

way an eight months' period of probation is obtained which results in the discovery of moral or other defects not brought out by a single examination and the saving to the service of some excellent candidates who have an opportunity to make up small defects in education or preparation.

'Appropriations have been obtained from Congress for the purchase of land and construction of a general hospital at Washington, D.C. This has long been needed and was recommended by Surgeon General Hammond in 1862. An appropriation has also been obtained for the purchase of much-needed book stacks at the Surgeon General's library, whereby this great national institution has been enabled to continue its invaluable services to the medical profession of the country.

'It has been the policy of the Office to encourage in every way important scientific work and original investigation and to assist other departments of the Government, although at some sacrifice on account of the shortage of medical officers. For example, Captain B. K. Ashford was for two years loaned to the insular government of Porto Rico to carry out his beneficent and very successful campaign against tropical "anæmia" due to hookworm disease. Colonel Gorgas and five other medical officers have been detailed to carry out the sanitary regeneration of the Isthmus of Panama. The purchase of their sanitary supplies has been taken over and rescued from confusion and delay. In like manner the purchase of medical supplies for the Department of Commerce and Labor has been undertaken at their request. Major J. R. Kean has for nearly two years been on duty on the staff of the provisional governor of Cuba, exercising supervisory control over the sanitary department of that island, with four other medical officers detailed to assist him. Cordial relations have been established with the organized militia, and all requests for medical equipment and supplies from them and from the Navy have been promptly complied with.

'Toward the chief surgeons a policy of decentralization has been steadily pursued, and as regards the Medical Corps at large

the necessity for good, earnest professional work has been emphasized, and a high standard maintained by stiffening the examinations for promotion, which it is the desire of this Office to extend to the higher grades.

'A new manual has been prepared in which the dominant idea has been not only to meet the needs of to-day, but also the exigencies of war and the requirements of field service, making all the details of administration plain to the untrained volunteer surgeon.

'Successful efforts have been made to come into close touch with the medical services of the organized militia to encourage them to regard themselves as the reserve of the regular Medical Department, to look to it for supplies, advice, and assistance, and in every way to promote a feeling of solidarity. At the same time no opportunity has been neglected to cultivate the sympathetic interest of the medical profession of the country in the special work of the Medical Corps, as they must ever constitute the great reserve which must supply the medical establishment of the nation in arms.'¹

General O'Reilly retired for age in January, 1909, and spent the remainder of his life quietly in Washington. He suffered much from ill health and died of uræmic poisoning on November 3, 1912. 'A brave and high-spirited officer in the field, he was, in his private relations, a man of extremely sensitive, refined, and retiring disposition, and, underneath a playful, quizzical manner, deeply sincere. His kindly genial nature, full of the Celtic charm, made every one his friend. It is no exaggeration to say that all who came in close contact with him loved him, and, by the same token, there was nothing they would not have done for him.'²

General O'Reilly was succeeded by George H. Torney, who was born in Baltimore, June 1, 1850. After graduation in medicine from the University of Virginia and the completion of a hospital internship, he entered the Navy as an Assistant Surgeon in 1871

¹ *Surgeon General's Report* (1908), 123-28.

² Garrison, F. H.: *New York Medical Journal*, 1912, xc, 1126.

and served until his resignation, on account of intractable seasickness, in 1875. He entered the Army on July 1, 1875. During the Spanish-American War he commanded the hospital ship Relief. He was thereafter instructor in hygiene at Fort Leavenworth, commanding officer in successive periods of the general hospitals at Hot Springs, Arkansas, Manila, and San Francisco. At the latter place he was simultaneously Department Surgeon. His work after the earthquake there has already been mentioned. When appointed Surgeon General, he kept as office assistants the same men and he carried forward without abatement the same policies that had been promoted by General O'Reilly. The reserves of officers, nurses, and supplies were all built up. Walter Reed Hospital was built, typhoid prophylaxis was pushed to universal use, sanitary measures were improved, the Army Medical School was strengthened, department laboratories established, scientific work encouraged, the education of medical officers in field work and medical tactics through the school at Fort Leavenworth was inaugurated, and the teaching of military hygiene in service schools was enlarged. The Medical Department continued to progress rapidly, and to prove its progress in maneuvers, post work, and the border mobilizations.

General Torney was reappointed Surgeon General in 1913. On December 27th of that year, he died rather suddenly of bronchopneumonia.

He was succeeded by William Crawford Gorgas. General Gorgas was born in Alabama on October 3, 1854. His mother was Amelia, the daughter of Governor John Gayle of Alabama; his father Josiah Gorgas, an officer of the Ordnance Department who, although born in Pennsylvania, threw in his lot with the South at the time of the Civil War and became Chief of Ordnance of the Confederacy. After the war, Josiah Gorgas was a teacher and college president. The son studied medicine and entered the Medical Corps of the Army, much against the advice of his father, who, like most officers of the Civil War period, had but a poor opinion of the Army surgeon's status and opportunities. En-

tering the service in 1880, Gorgas spent the next twenty years in Western and Southern posts, doing the small round of official duty and of frontier practice. In 1882, at Fort Brown, Texas, he had yellow fever, at the same time as the lady who later became his wife. On the Santiago expedition he had charge of the yellow fever hospital at Siboney, and he there contracted typhoid, as related by Colonel Arthur. After his recovery, he returned to Cuba and after a few months became chief sanitary officer. The story of his work there and in Panama has been told briefly in earlier chapters.

When General Torney died, Gorgas's work in Panama was drawing to a close. The Canal was completed and the Commission was about to pass out of existence. Gorgas had gained such fame for his work that his selection to succeed Torney was almost a necessity. He had already (1908) been President of the American Medical Association, had been granted honorary degrees by the University of Pennsylvania, Harvard, Brown, University of the South, Johns Hopkins, University of Alabama, and had been invited to South Africa to advise as to the control of pneumonia. While in Africa he received word of his appointment. He was given the rank of major general. He took to the office as his executive officer and principal assistant Major (afterward Major General) Robert E. Noble. Gorgas himself continued his interest in and work with yellow fever, and in 1916 he made a trip of several months to South America for the International Health Board, to outline plans for the eradication of yellow fever. In January, 1917, he informed the Secretary of War of his desire to retire, and Colonel Henry P. Birmingham was chosen to be his successor. The early severance of diplomatic relations with Germany and the near prospect of war caused Gorgas to remain, and soon he was at the head of a medical organization which exceeded in size all the armies of the Spanish-American War. To a degree beyond the possibilities of any other medical man in America, he had the confidence of the Army, of Congress, of the medical profession, and of the American people. To an equal degree he was

willing to accept help and expert advice. This came generously. The leaders of the profession rallied behind him and his Corps, Congress respected his advice and granted his requests, to a large extent American medicine became the Medical Corps, and it so continued throughout the war. General Gorgas's prestige was a tremendous asset in bringing this about. He remained Surgeon General until his retirement for age on October 3, 1918. He then again took up yellow fever work with the International Health Board. In 1920, he started again for Africa, was delayed to receive many honors in Europe, had a stroke of apoplexy, and after a month of illness died on July 4th. While sick he was visited by King George of England and made Knight Commander of Saint Michael and Saint George.

'He was a verray parfit gentil knyght.'

PART FIVE

THE WORLD WAR

The day has come when America is privileged to spend her blood and her might for the principles that gave her birth and happiness and the peace which she has treasured.

God helping her, she can do no other.

WOODROW WILSON: *War message to Congress*, April 2, 1917

PART FIVE
THE WORLD WAR
CHAPTER XIII

AMERICA IN WAR-TIME

THE real history of the World War is yet to be written with cool judgment and proper perspective. It is a task that will require years, and it perhaps cannot be undertaken in the proper manner for a long time. Involving in one way or another practically the entire civilized world and touching profoundly even the uncivilized, the data concerning it, the tons of official paper, are greater than ever concerned any other event in history. The official account of so small a fraction of it as the activities of our Medical Department already fills twelve great volumes of 13,474 quarto pages, and several volumes are yet to appear. How inadequate, then, must be the effort to give any proper picture in the few pages available in this story! Yet a picture must be made, for the Medical Department alone neither fought nor won the war. It was merely an auxiliary service of that army which participated for the shortest time and suffered the smallest percentage of losses. Nevertheless, Department and Army did good jobs, of which they are proud and which must be recorded here as their greatest efforts and their high-water marks of accomplishment in war.

The Department was, then, part of the greatest army America had ever known, a greater army than the world had known prior to this war, an army formed, for the first time in American history, in accordance with a wise military policy and a well-considered plan, one representing the entire nation, without distinction based on geography, wealth, religion, social affiliations, or color, except that negro troops were separate organizations and that entire divisions were drawn from States or regions.

General Scott,¹ who was Chief of Staff at the time of our entrance into the war, says that the proper functioning of the Army under the *bouleversement* it underwent in raising itself from one hundred thousand to four million men was made possible by three things: an adequate system of military administration, the splendid condition of the Regular Army, and conscription. To these should be added three other things (and the proof can be found in General Scott's book), namely, practical unanimity of public opinion, a great President who embodied that opinion as few, if any, other Presidents have ever done, a Secretary of War who came to his office reputed a pacifist, but was great enough to see the country's war-time needs and to take the responsibility of forwarding them, even in defiance of law. He authorized the War Department to expend \$50,000,000 in preparation for war before Congress had appropriated one cent. The Medical Department spent \$7,000,000.² He overrode the Judge Advocate General's interpretation of the law and so saved the General Staff from virtual desuetude.³ He and the President forced from a reluctant Congress the conscription law under which our armies were raised. To applicants for commissions he said, 'Go to some officers' training camp and earn a commission.'⁴

The great army was raised. The various departments of the Regular Army all had ready plans for expansion, although not for such expansion as came. Divisional cantonments were erected in all parts of the country as rapidly as possible, officers' training camps were established and were soon filled with eager, educated, well-selected young men taking intensive training in their new duties; factories, foundries, and arsenals were set going day and night to prepare the vast quantities of supplies needed, conservation of food and other materials was organized, rail and

¹ Major General Hugh L. Scott: *Some Memories of a Soldier*.

² *The Medical Department of the United States Army in the World War*, I, 227.

³ Scott, *op. cit.*; also pages 116-81, *Historical Documents Relating to the Reorganization Plans of the War Department and to the Present National Defense Act*. United States Government Printing Office, 1927.

⁴ Scott, *op. cit.*

water transportation were nationalized, credit and business were brought under national control, government bonds were sold and funds raised and expended in staggering sums. The sale of alcohol was restricted, but the people were exalted. The war was called a holy war. That judgment was affected is true, but are wars ever waged in the light of clear, calm judgment? Nothing was too bad to tell or to believe of the Germans, nothing too absurd to be cited by the more imaginative as proof of their devilish efficiency or ingenuity. A man passing often between his table light and his window, especially if he had a German name, ran the risk of being suspected of signaling governmental secrets to hidden German agents. With true patriotic fervor we changed *sauerkraut* to 'Liberty cabbage,' German Street to Liberty Street, removed the German language from school curricula, and tabooed German music at the opera. But not every one was absurd. The country had a vast fund of common-sense; in general it was devoted to winning the war, and that task was sensibly and properly performed.

The medical, dental, veterinary, and nursing professions were not behind the foremost in good work. When the officers' training camps were opened, three of them were for medical officers. These were located at Fort Benjamin Harrison, Indiana, Fort Riley, Kansas, and Fort Oglethorpe, Georgia (Chickamauga Park). They began work in June, in camps not yet completed and almost wholly without equipment of any kind, manned by a handful of medical officers and enlisted men. A fourth camp, for negro medical officers, was later started at Camp Dodge. They had a plan for instruction, drawn up by Colonel (afterward Brigadier General) E. L. Munson, Medical Corps, a man who can see farther than most, and who, seeing, can convert his vision into words and action. He did so in this instance. The Surgeon General gave Munson a free hand, and he started the ball to rolling. It rolled over the writer of this and rolled him into the mud of Fort Benjamin Harrison, when he was longing for the mud of France instead. But there were compensations, especially the hard work

and the association with the splendid men who soon filled the camp, leaving their families, their friends, their livelihoods, and coming to the mud, the hard work, and the recruit status of camp to learn how to fit into the great machine which was being formed. They were not hysterical. Their feet were solidly on the ground, but they had heard of France 'bled white' and England staggering, of German boastings, arrogance, and triumphs; they believed America and its ideals in danger, and they deemed their all not too much to give. Gallant gentlemen they were and of America's best.

The majority of our people had fondly hoped that we could avoid war, and Mr. Wilson was reëlected in 1916 partly for the reason that he had 'kept us out of war.' Perhaps it was largely for the reason that he had striven so hard to do it that the people were so nearly unanimous in his support when he read to Congress his war message. They felt that all possible means of placating Germany had been exhausted, that yielding had reached its limit, that it was time to strike and to strike our hardest. So they accepted conscription cheerfully, and as soon as the shelter was ready for them — sooner in fact — they were bound to the camps by hundreds of thousands. By that time the training camps were turning out their first graduates. The Medical Officers' Training Camps sent to each divisional camp an ambulance company, a field hospital, and regimental medical detachments, all sufficiently trained to undertake the training of the other units necessary to make up the divisional medical service; and other men to take part in administering the great hospitals established in each camp. They had also, before this, sent hundreds of officers for service with the British Army, of whom more later.

Meanwhile, the medical camps had grown. When they had sent away their early students, they quickly found themselves larger than ever, and they started training, not only new ambulance companies, field hospitals, and regimental detachments, but personnel for base, evacuation, and surgical hospitals and for hospital trains. Eventually Camp Greenleaf, at Chickamauga

Park, undertook the teaching of all sorts of medical, dental, and veterinary specialties, aspired to be a university. This was a dream perhaps too large, and no small effort was wasted, but thousands of men were sent out with training helpful to them and to the service. There was also waste of effort from the fact that officers and men upon whose training for special duties much time and instruction had been spent were often, after their arrival in France, put upon wholly different work, of which they knew little or nothing. This was also true in branches other than the Medical Department; whole divisions, for example, being broken up to form replacements in branches for which they had not been trained. It may have been inevitable then, but it was wasteful of effort, and plans for avoiding it in the future are being perfected.

The first graduates of medical training camps furnished, as stated, the training cadres of the divisional medical services of the National Army, but medical work in camps, unlike the work of the line, was by no means limited to training. All that new army had to be given thorough physical examinations, vaccinated, given typhoid and paratyphoid prophylaxis. The unfit had to be eliminated and discharged or given special treatment and training, the sick had to be treated, and the sanitation of the camps was the cause of constant solicitude and labor. Furthermore, the hospitals, instead of being pushed to completion first, as they should have been, were in many instances not completed when the troops reached the camps. From this fact, from the new and mostly untrained personnel and the not yet perfected administrative organization of the hospitals, resulted some unfortunate occurrences during the early days when measles and pneumonia overwhelmed the incomplete hospitals of some camps, especially in the South and West. All such occurrences were investigated by officers of the Inspector General's Department, by inspectors from the Surgeon General's Office, and by Congressional committees. Rarely was the trouble found avoidable under the circumstances, and in one instance in which a medical officer

was blamed and punished, an injustice was done, as the officer had done his best to avoid the cause of complaint. In another instance the commanding officer of a large hospital was criticized because of the poor work of civilian undertakers.

In general, the medical officers, trained or untrained, met very trying situations with good judgment, courage, and great efficiency. The Corps had expanded in three months from less than five hundred to more than ten thousand officers, and the work had grown in even greater proportion.

At first, training of officers and enlisted men in medical and other specialties was undertaken by civilian institutions which placed their facilities at the disposal of the Medical Department. As examples may be cited Carnegie Institute of Technology giving a course in automobile maintenance; Yale Medical School turned over to the Army the Brady Laboratory and built additions, where training was given officers in bacteriology and chemistry, and enlisted men were trained as technicians in those subjects; Rockefeller Institute gave training in various subjects, especially the Carrell-Dakin technique, and carried on several special investigations for the Army; brain surgery and plastic surgery were taught in schools in St. Louis, Chicago, and Philadelphia; roentgenology in New York, Boston, Philadelphia, Richmond, Pittsburgh, and other cities.

Special courses given in cities were usually controlled by the divisions of the Surgeon General's Office for which the training was done, not by the Training Division.

Besides the training camps and schools already mentioned, a dental officers' training course was given at Camp Greenleaf, and dental officers were given courses in oral and plastic surgery in schools in various cities; a veterinary officers' course was given at Camp Greenleaf and graduates assigned to home stations, or sent to a training school at Camp Lee, if destined for overseas service. A course in meat and forage inspections was given in Chicago.

The supply of trained nurses by the Red Cross met all demands, but with an eye to the future, an Army School of Nursing was

started, with branches in various military hospitals. The present school at Walter Reed Hospital is the legacy of that movement.

The General Medical Board of the Council of National Defense, with some sixteen subcommittees, was zealous in studying medical needs and in mobilizing medical personnel. The National Research Council, through its committees on medicine and psychology, also helped.

It appears that some of the new divisions established in the office of the Surgeon General arose from organizations and men injecting themselves into the office. At the time of the declaration of war, the office consisted of five divisions: Personnel; Records, Correspondence and Examining; Supply; Sanitation; and the Library and Museum.

With the tremendous growth of the Department, some of these were of necessity subdivided. The Personnel Division had to have sections dealing with medical, dental, veterinary, nursing, and enlisted personnel. The Division of Sanitation, which had had charge of all professional subjects, could not look after them all and separate Divisions of Hospitals, Overseas Hospitals, Laboratories and Infectious Diseases, Internal Medicine, Neurology and Psychiatry, General Surgery, Orthopedic Surgery, Head Surgery, and Roentgenology were carved from it, still leaving it large and important. Records and Correspondence of course remained, but the examining functions were transferred to the Division of Finance and Supply. The Library and Museum Division budded sections of photography, moving pictures, model-making, and a committee on Medical and Surgical History of the War; and Finance and Supply held its own, but subdivided inwardly. New divisions were created, some of them, such as Foods, Psychology, and Gas Warfare, not strictly medical; others, Air Service and Physical Reconstruction, had not been previously required. Soon there were twenty divisions, with various sections, all sending out letters and instructions in the name of the Surgeon General, and doing so at times without learning whether or not other divisions or sections had sent instructions directly contrary.

It was very confusing, particularly as various divisions of the Adjutant General's Office and of the General Staff were doing the same thing, and the camp commanders and their staffs also took a hand. From the multiplicity of advices the man in the field was apt to choose the most practicable, sensible, or expedient, so things went on pretty well. This multiplicity of divisions and resulting confusion were largely unavoidable.

The Division of Sanitation had its hands full with the subject of sanitation in camps all over the country. A Division of Hospitals, concerned with building, equipment, and administration, was necessary. But the builder and administrator of a hospital was not of necessity an authority on the surgical work to be done in it, so a Surgical Division was established. When the American Orthopedic Association had convinced the Surgeon General that most general surgeons were not orthopedists and that a Division of Orthopedic Surgery was necessary to promote, correlate, and standardize that work, it was reasonable then to put its man in charge of the division and give him a free hand. So with the others. As stated, psychology and food conservation were not strictly medical questions, but they were related thereto, so into the Medical Department they went; and there they did splendid work. Poison gases undoubtedly caused injuries which sent men to hospitals. Why should not the Medical Department prevent these injuries as it prevented typhoid fever? Let it furnish gas masks. So it furnished gas masks, 1,718,000 of them, along with 502,000 extra canisters, 154,000 horse masks, 11,000 trench fans, before the work was turned over to the Chemical Warfare Service in June, 1918.

To discuss in detail the work of the Surgeon General's Office would require far too much space, and would necessarily give the chapter 'that peculiarly arid quality so common in government reports.' However, a brief outline of office activities will be attempted, as that is the best way to make a picture in a small space. Small as was the office in comparison with the widespread medical activities in camp and hospitals, it dealt with all of them,

and by a description of it they are brought somewhat into view. That General Gorgas was in office was fortunate, even though his interest in disease prevention was greater than his interest in office administration, for no other man enjoyed such prestige as a medical administrator. There is little evidence that he took a great personal part in the administration of the office after war was declared. He consulted with the Secretary of War, with the Council of National Defense, and the General Medical Board; he appeared before Congressional committees; he consulted leaders; he visited camps and cantonments and looked into sanitation. He had no more time than inclination for the details of office work. Fortunately he had an able, loyal, hard-working officer as his executive, Major (later Colonel and then Major General) Robert E. Noble, who had been with him through the years of his Panama service. General Gorgas himself had an office room in a house in F Street, away from the Department and its whirl of business. Here he could see and consult in private those whom it was important to consult, and be hidden from the inconsequential. Upon Noble fell the demnition details. He was intelligent and capable, carried responsibility easily, made quick and usually good decisions, had tact with honesty and firmness. He managed the office and, considering the circumstances, did it extraordinarily well. Upon the retirement of General Gorgas, the choice of his successor lay between Noble and General Ireland. When the latter was selected, Noble was sent to France, where he did excellent service as chief surgeon of a base section, at Bordeaux. In the Surgeon General's Office, Noble was the Medical Department's chief of staff. He consulted with General Gorgas and carried out the general policies laid down by the latter. Under Noble were all the divisions of the office and to him all resorted for decisions and policies. At the outbreak of war he was not only executive officer, but also had the Personnel Division. The stress of work caused him to subdivide this in the manner already indicated and then to surrender it to Colonel Reuben Miller.

When we entered the war, Medical Department personnel on

duty was 639 officers, 303 nurses, and 6619 enlisted men. During the war it was multiplied almost fifty times. The Medical, Dental, and Veterinary Corps were recruited mainly through volunteering for the Reserve Corps. The Nurse Corps was increased from the Red Cross Reserve, and the enlisted force by volunteers and drafted men. The American Medical Association and its 'Journal' and other professional associations and journals greatly promoted the growth of the Reserve Corps. The National Guard brought in its own personnel.

Closely related to the Personnel Division were the Dental, Veterinary, and Nursing Divisions, each looking after affairs of the corps indicated, each dealing also with the Divisions of Supply, Training, Hospitals, etc.

The Finance and Supply Division, successor to the old Supply Division, dealt with finance and accounts, procurement and transportation of supplies, supply depots, foreign rents, property returns and records, and disbursements. The smoothness and efficiency with which this division performed its work was such as to attract no notoriety, a marked and wholesome contrast with conditions in previous wars. Colonel Carl R. Darnall was at the head of it. The division brought about a standardization of supplies for all services, which greatly facilitated, in fact made possible, successful manufacture of all of them in this country, whereas many, notably surgical instruments, had previously been imported. The division expended hundreds of millions of dollars ¹ and handled the total supply work with 16 officers of the Medical Corps, 331 officers of the Sanitary Corps, and 1421 enlisted men. The greatest difficulty that it experienced in shipping of supplies overseas was the lack of coördination between the movement of men and that of material, especially as regarded priority schedules. There were also difficulties in procurement. In many instances the material had not been mined or the crops planted, from which the supplies were to be made. Trees had to be felled, lumber sawn and transported for buildings in which stores were

¹ *The Medical Department of the United States Army in the World War*, I, 227.

to be housed. With these delays overcome and the stores ready to ship, space could not be obtained on transports. However, demands from the A.E.F. caused a modification of priority schedules in the summer of 1918 and supplies went over rapidly. In October, the last full month's shipment before the armistice, 52,762 short tons, about 6,331,440 cubic feet, of Medical Department supplies were shipped abroad, and 60 base hospitals of 1000 beds each were almost ready for shipment.

Early in July, 1917, a Hospital Division was created in the Office, with Colonel Noble at its head. It was later taken over by Colonel (later Brigadier General) James D. Glennan, who remained in charge until the hospital provision was well advanced on this side. He then went to France and took charge of the Division of Hospitals in the Chief Surgeon's Office. By late autumn or early winter of 1917 there were 44,000 beds ready in the large camps in the United States, and most of them in use. By June, 1918, the capacity of home hospitals in camps, equipped with personnel and supplies, was 73,066, and additional capacity for 16,799 beds was under construction.

Additional provision was made for sick and wounded from overseas. Certain army posts were converted into hospitals, large buildings were leased and some new construction begun, with the intent to have a large hospital for overseas sick and wounded in each draft district. Great embarkation hospitals were established at New York and Newport News, and special hospitals for tuberculosis, mental disease, amputations, and other special disabilities in other places. When the armistice was signed, there were in this country ninety-one large hospitals with 120,916 beds, additions authorized or under construction to provide for another 25,000 beds, and plans for 60,000 more.

The Overseas Hospital Division was organized for the purpose of assembling and shipping personnel and equipment for hospitals and units to serve overseas. It met with special difficulties because it had no control of shipments. It could assemble equipment and personnel for an entire base hospital or hospital train

and could send them to the port of embarkation. From there they might be shipped at different times, in different convoys and never meet again, the personnel being sent perhaps as replacements in units of different types.¹

The Division of Sanitation was under Colonel (later Brigadier General) Birmingham, until his retirement. Its work was the formulation of general policies of sanitation, the inspection of the work in camps, the collection and study of current statistics of sickness, and the assignment of non-divisional sanitary personnel. The actual work of sanitation of camps was done by the sanitary forces at the camps. The inspections came to be the most important work of this division. The inspectors sought to be helpful rather than fault-finding, and were able to be so in most instances.

In general terms it can be stated that the sanitary measures were eminently successful, with one very important exception. The group of respiratory diseases, the pneumonias, bronchitis, measles, and influenza, were not kept out of camps nor under control. It would be easy to inveigh against other departments and to blame overcrowding, the weather, too rapid and too large assembly of non-immune material; and these may all have been important. It is honest to say that we did not know, and do not yet know, how to control these diseases.

In this division was the section of Medical Records, which collated statistics and handled records of sick and wounded, hospital reports, casualty returns, etc. This section was charged with the collection of material for a future medical and surgical history of the war. In August, 1917, a 'Board to collect and prepare material' for such a history was appointed, with Colonel C. C. McCullough at its head and Lieutenant Colonel Fielding H. Garrison as chief worker. It studied similar projects in England and in France, prepared plans and collected material. From that beginning resulted the encyclopedic work on 'The Medical Department of the United States Army in the World War,' which is now nearing completion, under the editorship of

¹ *The Medical Department of the United States Army in the World War, I.*

Colonel F. R. Weed, and from which 'most of the information herein concerning the divisions of the Surgeon General's Office has been taken.

The Division of Infectious Diseases and Laboratories was a curious conglomeration of unrelated subjects, built around the personality and special abilities of Colonel Frederick F. Russell. It was increased by the addition of the activities of the American Social Hygiene Association and the Social Hygiene Board in the prevention of venereal diseases. Because venereal diseases touched both urology and dermatology, these two medical specialties were tacked on. The division was charged with the provision and standardization of equipment and personnel for chemical, pathological, and bacteriological laboratories; the training of personnel for laboratory work, and the laboratory investigation of infectious diseases; with the provision of typhoid-paratyphoid prophylactic vaccine; with the prevention of venereal diseases, by means which included moral instruction, propaganda by many means, legal measures for control or prevention of prostitution and the sale of alcohol in and around camps, the establishment and proper administration of stations for venereal prophylaxis; and with provision of experts for the supervision of the medical treatment of venereal, urological, and dermatological diseases.

Despite the incongruous grouping, all this work was well done.¹

The Division of Neurology and Psychiatry, under Major (later Colonel) Pearce Bailey, selected men with special training or aptitude for these specialties, supervised the methods in use in special hospitals for them, selected or trained officers for psychiatric work in divisions, and in general or surgical hospitals, and advised as to the establishment of special hospitals. The growth of recognition of the prevalence and importance of mental and nervous diseases in modern times, the improved understanding of and greater ability to prevent them through modern developments in psychology and psychiatry, and particularly the prevalence of 'shell shock' and other war-time neuroses in foreign armies during

¹ *The Medical Department of the United States Army in the World War*, I, 286.

the war gave to psychiatry and neurology a prominence which they had never before had in our Army. The division did admirable work and its representatives in the field a great amount of good.¹

It was always obvious that surgery was to play a great rôle in the Medical Department's work in the war, and the Surgeon General in June asked Colonel William J. Mayo to act as his adviser in regard to it. He came to Washington and a Division of Surgery was formed. Just why there were independent divisions of Military Orthopedic Surgery and of Head Surgery is not at this time quite clear, although the results are clear in part. Orthopedic surgery had previously been mainly concerned with the correction of deformities, quite largely with those of congenital or postural origin. In the war it started out modestly with work on flat feet and postural faults. During the war, probably because of the initiative of its personnel, it took over the definitive cure of fractures as well as deformities, had a large part in the surgery of the war, and did it excellently. The three surgical divisions all did splendid work, and the surgery of the war was in general highly successful, despite the greater frequency of infections in wounds than in those of the Spanish-American War. This increased frequency of infections was due to the dirty conditions under which the fighting was carried on. Thousands of medical men received a training and experience in surgical work during the war which have since been of great benefit to them and to the communities in which they have practiced since leaving the Army. Colonel (later Brigadier General) J. W. T. Finney was in charge of the Division of Surgery until he went to France and became chief consultant in the same subject. Colonel E. G. Brackett was Chief of the Division of Orthopedic Surgery, but it was largely due to the initiative and capacity of Colonel (later Brigadier General) Joel Goldthwait, Chief Consultant in Orthopedic Surgery in the A.E.F., that orthopedic surgery had so large a part in solving the surgical problem in France.

¹ *The Medical Department of the United States Army in the World War*, I, 384.

The Division of Head Surgery embraced sections of ophthalmology, otolaryngology, brain surgery, and oral and plastic surgery, with various subsections. It selected, classified, and assigned personnel for these specialties, arranged for its special training, and secured the organization of a section of head surgery in each base hospital. Ophthalmology and otolaryngology were very important because of the great numbers of cases with which they had to deal. Brain surgery, neural surgery, and plastic surgery dealt with relatively small numbers and could have been included as sections in the Division of General Surgery.¹

The Division of Psychology was the outgrowth of recommendations emanating from the American Psychological Association and the National Research Council, in the belief that group examinations of men could eliminate many mental defectives and give information upon which to establish classifications of men for special services, on a basis of aptitude. A section of psychology, under Major Robert M. Yerkes, was established in the Division of Neurology and Psychiatry. In the months of October and November, 1917, some 100,000 men were examined. The results appeared of great value. In January, 1918, a Division of Psychology was established, a school of psychology opened at Camp Greenleaf, and examinations were extended. Psychology received a boost in popularity only second to that which Freud's teachings had given it. By the time of the armistice, 1,151,552 men had been examined, the jargon of psychology had become slang, and the partly educated imagined that herein lay an easy road to leadership and power. The able psychologists like Yerkes were not responsible for such vagaries, which lessened the esteem in which the work was held after the war.²

Major (later Brigadier General) Theodore C. Lyster was designated Chief Surgeon of the Air Service (Signal Corps) in September, 1917. It was purposed to create a great air service in the shortest possible time and its personnel was to be given particu-

¹ *The Medical Department of the United States Army in the World War*, I, 442.

² *Ibid.*, I, 395. *Surgeon General's Report*, 1919.

larly careful and searching physical examination, with special attention to vision, equilibrium, and temperament. Skillful eye specialists, aurists, neurologists, and physiologists were required for these examinations, for the study of the subject of aviation medicine, and the improvement of tests. A central testing laboratory under Colonel William H. Wilmer was established at Mineola, Long Island, with branches at the flying schools. Examining units were trained for ten laboratories, where the work of examining and classifying aviators was later carried on. Flight surgeons, especially trained, were assigned to the various fields and others for service abroad. These men, in addition to examinations and other medical work, were to exercise watchful control over the mental and physical condition of aviators. From the laboratory at Mineola subsequently grew the School of Aviation Medicine which we have to-day.¹

The Food Division was authorized in October, 1917, and Lieutenant Colonel John L. Murlin, Sanitary Corps, was placed in charge of it. The objects aimed at were improvement of cooking and of nutritional value of foods, securing of a well-balanced diet, and prevention of waste. Nutritional surveys were made in camps and hospitals and much was accomplished. In July, 1918, authority was given for the appointment of nutrition officers in each camp and by the time of the Armistice twenty-seven camps had been so supplied and a class of twenty officers was in training at Camp Greenleaf. Never in history was an army so well fed as the American Army in the World War. The Food Division was not responsible for this, but it had a creditable part.²

As early as November, 1915, the furnishing of gas defense equipment had been tentatively assigned to the Medical Department and the responsibility was definitely placed there in May, 1917. A few days later, the Surgeon General was called upon to supply 1,100,000 gas masks. Meanwhile, a committee on noxious gases was formed in the National Research Council and investiga-

¹ *The Medical Department of the United States Army in the World War*, I, 488.

² *Ibid.*, I, 308.

tions begun. The Surgeon General submitted a plan for the work in June, 1917. This was approved, and work begun. Experimentation and production proceeded so rapidly that a special division was organized to handle the subject at the end of August, 1917, with Colonel W. P. Chamberlain in charge. The division had three sections, field supply, overseas repair, and training. Gas defense was taught in all medical training camps. The trained personnel developed in the Sanitary Corps by December, 1917, amounted to 186 officers and 1199 enlisted men. In February, 1918, this personnel was transferred to the Engineer Corps, and in June of that year the division closed and its work was taken over by the newly formed Chemical Warfare Service.¹

Prior to the war only the larger of the military hospitals had Roentgenological equipment, which was furnished by the Supply Division. However, the use of the X-ray in diagnosis was so thoroughly established that it was arranged to equip all hospitals with it. A separate Division of Roentgenology was established with Colonel Arthur C. Christie, M.C., in charge. The duties of the section were to train and furnish expert personnel, to standardize equipment, and to advise on the purchase of material by the Supply Department. To secure sufficient trained personnel, training courses were established in cities, and, later, in the military training camps and the Army Medical School. Hundreds of officers and technicians were trained. The X-ray service was very satisfactory and useful. War training in and use of roentgenology greatly extended its use, in the Army and out, after the war. Apparatus was examined and tested in New York and Washington. Factories were inspected and their capacities known before contracts were let. A standard table was designed and adopted, as well as a satisfactory portable apparatus. By the time of the armistice there had been shipped abroad 719 sets of X-ray apparatus.²

The Division of Physical Reconstruction was established in

¹ *The Medical Department of the United States Army in the World War*, I, 504.

² *Ibid.*, I, 465-70.

August, 1917, with Colonel Frank Billings in charge, for the purpose of assuring that every wounded, injured, or disabled man should be restored to efficiency so far as possible, before being turned out on his own resources. The work of the division was divided among four sections. The first assisted in selecting hospitals; the second had charge of plans for special treatment, as of the blind, the deaf, those with speech defects; the third was concerned with occupational therapy in shops and laboratories; the fourth section prepared information, pamphlets, circulars, etc. Inasmuch as the greater part of the reconstruction work was done after the armistice, it will be mentioned again in a subsequent chapter.¹

No account of the war and the Medical Department's part therein would be even decently complete if the works of the numerous and important voluntary aid associations were not mentioned. These offered avenues by which the women and other non-combatants of the country could contribute toward winning the war, and they played a great part. Most important in wealth, personnel, and ability to aid was the Red Cross. Next in importance came the Young Men's Christian Association, the Young Women's Christian Association, the Knights of Columbus, the Young Men's Hebrew Association, and the Salvation Army. These worked with the Army as a whole, providing facilities for entertainment, rest, and instruction in camps, cities, and field.

The Red Cross worked mainly with the Medical Department, furnishing hospitals, ambulance units and enormous quantities of supplies. Its organization extended into every hamlet, and through it the women of the country could contribute personal labor and whatever else they had to contribute. It was a vastly greater and more important organization than in 1898, and was the Medical Department's most valued assistant.

The American Social Hygiene Association came forward early with well-considered plans for the prevention of venereal diseases.

¹ *The Medical Department of the United States Army in the World War*, XIII, 3.

Its plans and personnel were taken over bodily by the Medical Department and used throughout the war. The plans embraced measures which the Army alone had never before been able to use, including the establishment of a Social Hygiene Board with large appropriations and powers, the suppression of prostitution in the neighborhood of camps, the isolation and treatment of infected prostitutes, a great educational campaign against sexual promiscuity, and other social measures of like wide scope. To this association the Army is indebted for much of the good showing it made in regard to venereal diseases.

While the Surgeon General's Office was thus functioning, four million men were called into service, sent to divisional camps located in all sections of the country, carefully examined physically, vaccinated and given typhoid prophylaxis, put into uniform, organized into companies, regiments, and divisions. They were lectured, drilled, and trained for weeks and months. They were shifted from camp to camp by thousands, taking with them such diseases as they were incubating, thus infecting all camps as impartially as human ingenuity, or the lack of it, could assure. Fatigue, exposure, and crowding made them easier victims for infections, and the infections came. They had measles, mumps, bronchitis, sore throat, and influenza. After the measles and influenza came pneumonia, cutting off young lives as typhoid had cut others in 1898.

For a few months the most widespread and fatal epidemic known to modern times, if not to history, raged throughout the world. From Greenland's icy mountains to India's coral strand it killed its millions. Northern India and Afghanistan probably suffered more severely than any other region on earth, but islanders of the far South Seas died as of plague.¹ From all the armies of Europe and from every camp in America influenza exacted its heavy toll. Two million of our four million men had been sent abroad by the time influenza reached its peak in

¹ *Report of the Pandemic of Influenza, 1918-19*. Ministry of Health, London, 1920.

America. These did not suffer as severely as the men in the home camps, although they did not escape lightly.

Influenza and pneumonia swept through the great camps, which were really crowded cities, in the fall of 1918, claiming victims from among the strongest and most vigorous. The Medical Department was almost overwhelmed. Hospital facilities were inadequate and had to be enlarged by extemporized use of barracks, tents, and mess halls. The hospital at Camp Devens, normally accommodating 2000 patients, had at one time 8000. Medical personnel sickened as did other, and at one time 90 of 300 regular nurses at Devens were sick. The line was called upon for attendants. So rapidly did deaths mount that many camps were unable to prepare bodies for timely burial.

In civilian areas the epidemic played equal havoc with those people of the same age as the soldiers, but taking the population as a whole, the devastation was much less than in camps. It was the young adult from twenty to thirty-five who suffered most.¹ There were not doctors and nurses enough to attend the sick in the civil communities, and many died without attention.

The following excerpts from the Surgeon General's Report for 1919 tell much in little space:

'1. The total number of admissions during 1918 for diseases, for officers and enlisted men, American and native troops, was 2,422,362: for ordinary injuries, 182,789: and for battle injuries, 227,855.

'2. The total number of deaths from disease was 47,384: from wounds received in battle (cases treated in hospital), 13,735: killed in action and lost at sea, 34,359: from ordinary traumas, 3500.

'3. Including the deaths from 1917, there were 50,714 from disease and 52,423 as the result of injuries of various kinds, including wounded, killed in action, and lost at sea.

'4. The total number of days lost from disease for the year was

¹ Vaughan and Palmer: *Epidemiology and Public Health*, I, 313. C. V. Mosby Company, St. Louis, 1922.

40,692,302, from battle injuries 12,545,442: and from ordinary injuries, 3,687,060. The average number of men absent each day of the year on account of sickness and injuries was 155,957. Seventy-one per cent of the time lost was caused by disease, 6 per cent by ordinary injuries, and 22 per cent by battle injuries.

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'6. For the first two years of the Civil War, as compared with 1917-18, the admission and death rates for disease were three and one half times as high.

'7. Comparing the rates for the Spanish-American War and the Philippine Insurrection, 1898-99, with those of 1917-18, the admission rate in 1898-99 was a little over twice as high and the death rate about 20 per cent higher.

'8. The admission rate for the specific fevers and the diseases of the intestines (including diarrhoea and dysentery) was 29 times as high in 1861-62 as in 1917-18, and the death rate was 258 times as high.

'9. For these diseases for 1898-99 the admission rate was 24 times as high and the death rate 125 times as high as in 1917-18.

'10. For the acute infectious diseases (excluding influenza, pneumonia, and the common respiratory type) the admission rate for 1861-62 was practically the same as in 1917-18. The death rate in 1861-62 was two and one half times as high as in 1917-18, but 8 per cent lower in 1898-99 than in 1917-18.

'11. The respiratory type, including influenza, pneumonia, and the common respiratory diseases, had higher admission and death rates in 1917-18 than for either 1861-62 or 1898-99.

'12. Influenza, probably associated with virulent pneumonia, was epidemic during the latter part of 1917 in this country and Europe. The epidemic declined during the cold dry winter weather, increased again in the spring, after which it again declined, but continued throughout the summer, to rise again to the high point in the autumn months.

'13. Influenza, combined with pneumonia and respiratory diseases, caused 17.33 per cent of all admissions for diseases and 82

per cent of the total deaths. This type of disease was the most important cause of loss of time.'

It is a sad story, that of the respiratory diseases, and Medicine sits bowed and humble when it is told. It had its thousands of heroic incidents, as has a lost battle or a lost cause, but those are due to the common humanity of man, not to that Medicine which takes pride in its scientific attainments. Medicine knows that it has not reached its goal, that the age-long struggle for the mastery of infections is only partly won, that bitterness and humiliation must yet be drunk. For a short time it seemed that Captain George B. Foster, Medical Corps, had opened a promising lead when in 1916 he demonstrated ¹ that certain 'colds' were due to an invisible and filterable virus, but no further advance has been made along his lines. But Medicine did not lose heart. It had accomplished enough in the past hundred years to know that it had more than justified its existence, that it can solve mysteries and win battles. It girded itself again, as many a time before, and at least earned the respect and sympathy of the public for its devoted work.

¹ *Journal of the American Medical Association*, 1916, XLVI, 1180.

CHAPTER XIV

THE AMERICAN EXPEDITIONARY FORCES

ALTHOUGH the war was fought in France, the part of the American effort and work expended on it was there less than in America, because all of the four million men taken into the service were recruited in America, physically examined, housed, personally equipped, organized, and drilled for a longer time than they averaged in France, and the equipment and supplies shipped there were gathered in America. Only half of the army got abroad at all. Of these, about sixty per cent took part in combat. To this fraction were the wounds, the battle deaths, and the glory in major amounts; but as one star differeth from another star in glory, so was there a different and lesser glory for the man who got to France, even if he never heard a hostile shot or got within many miles of one. This lesser glory was at least marked by a gold stripe on the sleeve, instead of the silver stripe, by a Sam Browne belt and an overseas cap. Trifles these, but trifles that burned scars on sad military hearts, and trifles too that were as indicative of the direction of the wind as was ever the proverbial straw. To the A.E.F. was the glory; to the man at home quite as hard work, and disappointment. To the man who did not 'get into it,' who was kept at home because of his ability to do splendid work there, or for no reason except that the cards fell that way, the years have brought assuagement of grief, as they have brought it to the widow and the childless whose dead lie in France, but his grief was very real, bitter, and undeserved. Probably in no other condition confronting man does blind luck play so large a part as in war. However, two million men went to the A.E.F., fought a great war, came out victorious, and won deserved glory.

After the United States declared war against Germany, Great Britain and France at once sent missions to Washington to co-

ordinate plans and to explain how this country could best and most effectively help the Allies. Events proved that the Allies needed all the help that they could get and all that America could contribute, and that much they did get. At the moment, the extent of that was not known, and America was not prepared to take any great part in the war. However, both British and French desired immediate help of whatever kind they could get, as a sign of promise. Both were in need of help for their medical services, and our Medical Department was in a position to extend aid at once. Great Britain asked for six base hospitals, with personnel and equipment complete, and for a thousand additional medical officers for service with British troops. France asked that the American Ambulance Service, a non-military, volunteer organization of young Americans then serving in France, be militarized and augmented. Both of these requests were granted, the first units sent being Red Cross Base Hospital Units and Red Cross Evacuation Units, the organization of which as a reserve was discussed in Chapter VIII. The first 300 medical men for combat units were reserve officers without military training.¹

Six hospitals sailed for Europe between May 8 and May 19, 1917, and reached there before General Pershing. They and their parent institutions were as follows:

	DESIGNATION		PARENT INSTITUTION
	American	British	
Base Hospital No.	2	B.G.H., No. 1	Presbyterian Hospital, New York
" " "	4	" " "	No. 9 Lakeside Hospital, Cleveland
" " "	5	" " "	No. 13 Harvard University, Massachusetts
" " "	10	" " "	No. 16 Pennsylvania Hospital, Philadelphia
" " "	12	" " "	No. 18 N.W. University, Chicago
" " "	21	" " "	No. 12 Washington University, St. Louis

The American Ambulance Service was militarized with a much-reduced personnel, as many of the young men in it preferred service in combat units after America entered the war. The reserve units already organized within the Red Cross were taken

¹ See Appendix 6.

into service; a camp was established at Allentown, Pennsylvania, under the late Colonel E. E. Persons, new units organized, trained and sent to France and, later, thirty of them to Italy.

The first 300 detached officers were sent to England and put into training camps. Later contingents, amounting to almost 1000 more, were drawn from the Medical Officers' Training Camps in America.¹

General Pershing had been designated to command the American Expeditionary Forces. He chose his own staff and selected Colonel M. W. Ireland, M.C., to be his Chief Surgeon, but Colonel (later Brigadier General) A. E. Bradley, who was in Europe when war was declared, was Ireland's senior, and was designated for the position by the Surgeon General. Colonel Ireland expressed his perfect willingness to serve as Bradley's assistant and did so, incidentally carrying the burden of most of the work of the office and Medical Department organization of the A.E.F., as Bradley was a sick and suffering man, who did his work only by heroic effort. In April, 1918, he was invalided home because of disability, was later found to have a lung abscess, and had to be retired. He remained an invalid until his death in December, 1922. After Bradley's departure, Colonel Ireland was made brigadier general and Chief Surgeon, although he had himself recommended Colonel McCaw for the place. In August, Ireland was made a major general and Assistant Surgeon General, A.E.F.

Other than what medical units and medical officers with the British Army were doing, the first work of the A.E.F. was organization. This went on almost wholly independent of the similar reorganization in the Army at home. Considering the organization of the General Staff as an example, it was twice reorganized in the United States² and twice in the A.E.F.,³ and General

¹ Concerning their experiences, see Appendix 6.

² See General Orders 14. W.D., February 9, 1918, and G.O. 80, W.D., August 18, 1918.

³ See G.O. 8, A.E.F., July 5, 1917, and G.O. 31, A.E.F., February 16, 1918.

Hagood tells us that another great change in the A.E.F. was stopped by the armistice. No two of these various reorganizations were quite alike.

Fortunately, the Allies held the enemy while we perfected our organization and our combat units. Fortunately also, the Allies furnished much equipment, such as airplanes and artillery, which we had not had time to prepare for ourselves. Excellent and efficient as was our preparation and successful as was our participation in the war, these facts make it unsafe for us to rely upon exactly similar procedures in the event of another great war. Had the enemy fallen upon us with as little warning as upon Belgium, we should have been in a terribly bad way. As it was, we were able to form, organize, and train armies for almost a year before they went into battle. 'Our success in the war was not due to our forethought in preparedness, but to exceptional circumstances which made it possible to prepare after we had declared war.'¹

Three divisions of troops were sent to France before the great movement began, for much the same reason that the medical units had been sent earlier, namely, to do what good they could, but also to hearten and encourage our hard-pressed allies. They were the 1st (Regular Army), and the 26th and 42d (National Guard) Divisions. They reached France in June-July, September-October, and November-December, 1917. The 2d Division, of Regular Army and Marine regiments, was organized in France in the latter part of 1917. These divisions were given some months of training and took part in combat in May, 1918. By that time other divisions were arriving and having their overseas training, and in July the 3d, 28th, and 42d Divisions, in the line with the French, helped to repel the last great German drive on Paris. In the same month the 1st and 2d Divisions participated in the Aisne-Marne offensive, still with the French, and the 3d, 4th, 26th, 28th, 42d, and 77th were soon driving the retreating Germans across the Vesle. Two divisions, the 27th and 30th, were

¹ General Pershing: Statement before Military Committees of Senate and House, October 31, 1919.

with the British. By August 1st, there were twenty-seven combat divisions in France. During August, American divisions and corps were concentrated in the neighborhood of Toul and the Saint-Mihiel salient and the entire zone was turned over to them by the French. The First American Army was organized, General Pershing commanding. Colonel Alexander Stark, M.C., was Army Surgeon. By September the combat divisions in Europe were distributed as follows:

(1) Six divisions in the Vosges Mountains for preliminary training under the French.

(2) Fourteen divisions in the American Army area.

(3) One division in training area.

(4) Five divisions near Verdun and the Argonne Forest.

(5) Two divisions with the British.

A great assault upon the Saint-Mihiel salient was planned, troops and supplies were being concentrated, and it was feared that hospital accommodations might be insufficient for the sick and wounded. While preparations for attack were going forward, let us return to the Service of Supply and see what had been and was being done.

A detailed discussion of the Army organization, of the General Staff, of the Line of Communications, and the Service of Supply is not necessary in this book and it has been discussed by General Hagood and others with much more knowledge than could here be brought to bear. Attention may be called to the obvious fact that, great as is the Medical Department of a great army in battle, the greater plant of the Department is far back of the lines, in the area to which the sick and wounded are evacuated and in which they are hospitalized, the area from which supplies of all kinds are sent forward. So the greater medical organization in the A.E.F. was a part of the Service of Supply. Barring mobile hospitals for very temporary shelter and speedy evacuation of the wounded, all hospitalization was there. Thither ran the hospital trains and there served the larger part of Medical Department personnel. The organization of field units, sanitary trains, regi-

mental detachments, and evacuation hospitals had been effected in America, along with that of the combat divisions, so their building-up was scarcely a part of the organizational task in the A.E.F. They had to be re-equipped.

The relation of the combat units, the fighting army, to the Service of Supply has been likened to the relation of house and foundation. The object of the foundation is to support the house and without its support the house cannot stand, but people look at and admire the house. The builder of the foundation may feel its importance; others rarely think of it. The medical units with combat divisions went into the superstructure. The great medical problem of the Chief Surgeon was concerned with the foundation. The task for which preparation could not be perfected in America was the reception of the sick and wounded from the divisions in the line, their transportation to the rear, their hospitalization and treatment there, and their return to duty or their transfer home as invalids.

On June 13, 1917, the Medical Department serving in the A.E.F. consisted of seven officers and two enlisted men. It had no equipment and was yet to effect its organization. By November 12th it had expanded to 15,276 officers, 8500 nurses, and 134,300 enlisted men, and it had 193,000 sick and wounded receiving excellent care.

The first organization of the A.E.F. was naturally almost a replica of the organization of the War Department, with which the officers were familiar, and the Chief Surgeon's Office was similar to the Surgeon General's. In July (1917) that office was organized in five sections; personnel, sanitation, records, hospitals, and supply. The large tasks which were to go on simultaneously, were (1) the provision of hospitals, (2) the distribution of personnel and supplies, (3) the perfecting of an organization which would fit into and work smoothly with the organization of the A.E.F. as a whole. All three were pushed rapidly. All could be pushed more rapidly than otherwise because, as General Ireland wrote: 'No organization in the world ever received greater

support than the Medical Department^e in the A.E.F. received from the Commander-in-Chief from the beginning. Had the Department failed, it could not have shown that it did not have one hundred per cent of support.'

Happily the results justified the support and the Commander-in-Chief, and there was no occasion for resorting to excuses.

Two types of hospitals were decided upon: Type A, a 1000-bed, standard type, base hospital, with room for crisis expansion to 2000 beds, and Type B, a 300-bed camp hospital, capable of expansion to 1000 beds. A plan of procurement was elaborated and the work of renting and construction was begun. The first estimate, approved in August, 1917, called for 73,000 beds. By October the plans called for 200,000 beds. By December there were 63,000 beds ready.

In July, 1917, the Chief Surgeon's office was moved to Chaumont, but in February, 1918, the Line of Communications, later the Services of the Rear, and finally the Service of Supply or S.O.S., was set apart from the Zone of the Armies or 'The Front.' The supply departments, including the Medical, were under the Commanding General, S.O.S., and had their headquarters at Tours. The whole S.O.S. was divided into sections and a District of Paris. The sections were the Advance Section, northeast of Paris and Dijon; the Intermediate Section, centered at Tours; Base Section 1, centered at Saint-Nazaire; Base Section 2, at Bordeaux; Base Section 3, in the British Islands; Base Section 4, about Le Havre; Base Section 5, at Brest; Base Section 6, along the south coast of France; and Base Section 7 centering at La Pallice. Later there were base sections established in Italy and Belgium. Each of these sections had its own Chief Surgeon. At first it was a simple matter for the Chief Surgeon to oversee all medical affairs in the A.E.F., but with the organization of an American Army, with its own Army Surgeon, medical matters in the Army passed to the control of the latter, much as they had passed to Letterman's in the Army of the Potomac.

Medical affairs were handled in the General Staff mainly by

G-4,¹ but in some respects by other sections, and in all of these the Chief Surgeon had his chosen and trusted representatives, and things worked in general harmony. As time went on and battle activity increased and made necessary closer relations between the fighting forces, with which the Chief Surgeon was not in close touch, and the S.O.S., the G-4 section at G.H.Q. in particular took more part in correlating Medical Department affairs, and it was largely owing to the loyalty and ability of Colonels S. H. Wadhams, A. D. Tuttle, and A. P. Clark, M.C., that the medical services in the Zone of the Armies and in the S.O.S. worked together and supplemented each other so efficiently and satisfactorily.

The question of Medical Department personnel at times gave great concern. As it all had to be brought from America and could come only in accordance with schedules of priority not prepared by the Medical Department, it was nearly always on the verge of insufficiency. Early estimates called for a strength of 14.5 per cent of the army. This was cut to 11.5 per cent and then to 7.65 per cent, and even the last figure was not reached until after the armistice. In consequence, evacuation hospitals were robbed of their personnel before the fighting began, and S.O.S. units were later robbed to fill up evacuation hospitals and units with combat troops. The great offensives of October, 1918, together with the influenza epidemics then raging, put upon the Department a burden which it could carry only by heroic efforts. The total Medical Department personnel at different times is as shown in table on page 329.²

An Army Sanitary School was established at Langres, where most officers' schools were located, and about five hundred medi-

¹ The General Staff, A.E.F., was divided into five sections. G-4 was the fourth of these and its duties were the supervision of supplies, construction and transportation in France, including the location of railway and supply establishments, the supervision of hospitalization and evacuation of sick and wounded and all operations of the Service of Supply not assigned to other sections of the General Staff.

² *The Medical Department of the United States Army in the World War*, II, 93.

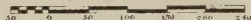
AMERICAN EXPEDITIONARY FORCES

REFERENCE MAP

SHOWING LOCATION OF SECTIONS



Scale in Kilometers



NOTE

LEGEND	NATIONAL BOUNDARIES
	SECTION LINES
	LINE OF COMMUNICATION
	LESSER RAILROAD LINES
	LOCATION OF TOWN

THE AMERICAN EXPEDITIONARY FORCES 329

	OFFICERS	NURSES	ENLISTED MEN
June 15, 1917.....	7	0	2
June 1, 1918.....	5,198	2,539	30,574
August 1.....	9,601	4,735	67,144
November 30.....	17,487	8,951	137,403
Highest number.....	18,146	10,081	145,815

cal officers were sent through it before the armistice. Colonel B. K. Ashford commanded it.

The Dental Service of the A.E.F. was satisfactory. There were thirty dental officers with each division, and in combat they frequently rendered the same kind of service as regimental medical officers. The Dental Service in the S.O.S. was essentially like that in America, being distributed in the hospitals, the large camps, and the cities where troops were concentrated. Colonel Robert T. Oliver, D.C., was in charge of the Dental Service.

The Veterinary Service was organized in September, 1917, as a part of the Remount Service. The plan was a mistake and a failure. In July the service was returned to the Medical Department, a Chief Veterinary Officer appointed, suitable regulations and a good organization adopted. The service was operating well when the Chief Veterinarian was relieved and a cavalry officer put in his place. This officer made no changes and the service continued satisfactory, but the man who made it so was discredited unjustly.

The nurses who accompanied the first six hospitals to Europe and other nurses arriving in France in the early months of the war were under the jurisdiction of the Personnel Division. In October, 1917, General Pershing requested that a Superintendent of Nurses be appointed, and Miss Bessie S. Bell, formerly Chief Nurse at Walter Reed Hospital, was designated. When the S.O.S. was formed, her office became a section of the Personnel Division. She continued Superintendent until October of 1918, when a Director and two Assistant Directors of the Nursing Service were appointed. Miss Julia C. Stimson was appointed Director and relieved Miss Bell.

The first estimates for medical personnel (for an army of 1,000,000) called for 22,430 nurses, or 22 per 1000 men. The numbers never approximated such a ratio. In the first six months about 1100 nurses arrived, of whom half served with the British. By March, 1918, there were 2099 nurses in France, 700 of them with the British. There was a shortage of 400, due to lack of transport, as there were at times as many as 1900 nurses in New York awaiting transportation.

The combat activities of June and July put such a burden upon the Medical Department that the Chief Surgeon cabled for more personnel, including 2312 nurses. One thousand arrived in July. September saw another shortage, on account of influenza. When the armistice was signed, the number of nurses on duty was 8587, and the shortage was estimated at 6925. The number of patients in hospitals was then 193,026. Following the armistice 1500 more nurses arrived. The greatest number on duty at one time, 10,081, was reached in the first week of December.

Nurses were assigned principally to base hospitals, but not to them alone. They were also in camp, evacuation and mobile hospitals, and hospital trains, in a few instances in field hospitals. Each base hospital had its Chief Nurse, and over these, in hospital centers, was a Chief Nurse of the center. The Army had never before had such skilled and good nursing. Two nurses were wounded, 102 died from disease or accidents. Approximately 10,000 of them rendered service which was thoroughly satisfactory.

Following the example of the British we sent to France a number of the most eminent men in various lines of medical practice as 'directors' of various special lines of medical and surgical work. The designation 'director' was unfortunate, as it implied direction, while Army Regulations did not define their work and the gentlemen were not of military mind or training. Later they were designated 'chief consultants' and their activities were correlated, one with another, and with the medical service in general, by a Director of Professional Services, Colonel William L. Keller, M.C.,

with excellent and highly beneficial results. They did work of great importance.

These chief consultants were:

SURGICAL SERVICES

- Brigadier General John M. T. Finney, M.C., chief consultant.
- Colonel George W. Crile, M.C., senior consultant in surgical research.
- Colonel Arthur C. Christie, M.C., senior consultant in Roentgenology.
- Colonel Harvey Cushing, M.C., senior consultant in neurological surgery.
- Colonel Joel E. Goldthwait, M.C., senior consultant in orthopedic surgery.
- Colonel James F. McKernon, M.C., senior consultant in ear, nose, and throat surgery.
- Colonel Charles H. Peck, M.C., senior consultant in general surgery.
- Colonel Hugh H. Young, M.C., senior consultant in venereal and skin diseases and genito-urinary surgery.
- Lieutenant Colonel Vilray P. Blair, M.C., senior consultant in maxillo-facial surgery.
- Lieutenant Colonel James T. Case, M.C., senior consultant in Roentgenology.
- Lieutenant Colonel Allen Greenwood, M.C., senior consultant in ophthalmology.

MEDICAL SERVICES

- Brigadier General William S. Thayer, M.C., chief consultant.
- Colonel Thomas R. Boggs, M.C., senior consultant in general medicine.
- Colonel Warfield T. Longcope, M.C., senior consultant in infectious diseases.
- Colonel Thomas W. Salmon, M.C., senior consultant in neuropsychiatry.
- Lieutenant Colonel Richard Dexter, M.C., senior consultant in general medicine for poisoning by deleterious gases.
- Lieutenant Colonel Alfred E. Cohn, M.C., senior consultant in cardiovascular diseases.
- Lieutenant Colonel Gerald B. Webb, M.C., senior consultant in tuberculosis.
- Major Franklin C. McLean, M.C., senior consultant in general medicine.¹

The problem of Medical Department supplies was handled very satisfactorily, growing with the army. A base supply depot was first established at Saint-Nazaire. Later, others were placed at

¹ *The Medical Department of the United States Army in the World War*, II, 385.

Cosne, Is-sur-Tille, Gièvres, and at other base ports than Saint-Nazaire. The armies drew mainly from Is-sur-Tille. When they were engaged, they drew from army dumps or army parks established at points farther in advance and keeping in stock always eight days' supplies for divisions drawing from them. Later still, advanced depots were established for the replenishment of the dumps. There were a few times when special supplies were insufficient; for example, splints, but the Red Cross established a splint factory which supplied the needs. It is interesting to note that, although the Medical Department was classed as a supply department and its headquarters consigned to the S.O.S., only one per cent of its personnel was on duty in or under the Supply Division of the Chief Surgeon's Office. In November of 1917 the issue of gas masks and gas defense clothing in the A.E.F. was turned over to the Chemical Warfare Service, so that that particular branch of supply work was there never very important to the Medical Department.

On the other hand, the treatment of gassed cases and the provision of hospitalization for them was very important. Colonel H. L. Gilchrist,¹ Medical Corps, shows that 70,552 gassed cases were treated in hospital and that 31.4 per cent of battle casualties were due to war gases. He also makes out a very substantial case for his favorite thesis that war gases constitute the mildest, most merciful, and most effective of war weapons.

The procurement of hospitals in France, where hospitalization of millions of soldiers was already provided for, was difficult. The division hospitals provided for little more than first aid at the front. The evacuation and mobile hospitals did more surgery, but they also hurried the sick or wounded man to the S.O.S. as rapidly as possible. The base hospitals sent overseas consisted of personnel and primary equipment, but buildings had to be found for every one of them. The buildings were rented if possible, constructed if necessary.

¹ *A Comparative Study of War Casualties from Gas and other Weapons.* U.S. Government Printing Office, 1928.

The first hospitals provided were of Type B, 300 beds, one in each divisional training area, but all base units, although originally planned and equipped for 500 beds, were provided with Type A housing, for 1000 beds, and equipment and personnel were increased. There was economy in having the larger unit, and further economy in grouping these units into hospital centers with common water supplies, roads and railways, lighting plants, etc. The hospital centers had from 10,000 to 25,000 beds each. All hospital construction was done by the Engineer Corps, and at the larger centers it built veritable cities with most of the general utilities of modern cities. Much hospital construction was so poor that the buildings would have become unserviceable in a very short time had the war continued, and most of the buildings rented for hospital purposes had grave faults which would have prevented their use had the need been less pressing. Among such faults were those found in many large summer resort hotels, lack of heating equipment, many stories with no or inadequate elevators, small rooms, little and poor plumbing, etc. Schools were rented in which the school work had to be kept up and the school personnel had their living quarters. That hospitalization was so satisfactory as it was, in spite of poor plants and crowding, speaks volumes as to the high quality of personnel and equipment.

On November 11, 1918, 'normal' beds were available as follows: 78,139 in buildings of American construction, 86,013 in French buildings, and 28,692 in tented convalescent camps. These convalescent camps were established at hospital centers for two reasons; first, to free beds in wards for men who needed constant hospital attention, and, second, to permit of training, recreation, and instruction for men who had not yet so fully recovered from their sickness and injuries as to be fit for full duty, but who were obviously approaching that status.

A very brief description of one hospital center will give an idea of the construction and organization of all. This center occupied 172 acres of ground and consisted of thirteen sections and a cemetery. Ten of the sections were general hospital units, each having

55 buildings, with a normal capacity of 1000 beds and crisis expansion of 1000 more. One section was a quartermaster camp, one a convalescent camp with accommodations for 2000 men, and one a psychiatric hospital with special personnel. The whole center was located astride a double-track railway spur. A water supply system furnished 20,000 to 50,000 gallons of water daily. A complete sewer system, discharging into a sedimentation tank, was installed. A central lighting system was established, but was not sufficient for all needs.

The Division of Sanitation faced greater local difficulties than did the corresponding division in the Surgeon General's Office. The French Army had had 50,000 cases of typhoid in 1914, and every training area occupied by the Americans was infected and practically all water supplies contaminated. Rural sanitation was almost unknown. Billets were usually overcrowded, were often in stables and outhouses, and were generally in the midst of very unsanitary surroundings. Prostitution was more in evidence than at home and sexual temptations frequent. In the Zone of the Armies conditions were even worse. Muddy trenches and crowded dugouts, lice, itch, and lack of bathing facilities reproduced conditions reminiscent of bad medieval times. The climate was wet, cold, and depressing much of the time. To offset these disadvantages, the American troops in France had had a year of training and instruction in hygiene; they had all been vaccinated against smallpox, typhoid, and paratyphoid fevers; they had practically all had measles and passed from the recruit status. These more than counterbalanced the disadvantages of locality, and the rates of non-effectiveness and of deaths from disease were considerably lower than at home.

At home, administration was centralized and the Surgeon General was in immediate touch with sanitary matters in all the great camps. In France, there was decentralization, and sanitation in the various sections and areas was under section commanders and surgeons. The Surgeon General sent his inspectors to all camps. In France that could be done to a small extent only.

The work of the Sanitary Division of the office was therefore largely limited to the collection of data, the preparation of epidemiological charts, the issue of circulars and a very useful weekly Bulletin, and special investigations. Many of the latter were carried out indirectly, through the agency of the Division of Laboratories and Infectious Diseases. After March, 1918, daily telegraphic reports of all communicable diseases were received, and investigation, instruction, or advice supplied as necessary.

That the sick rates were relatively low in all parts of the A.E.F. speaks for the excellence of the sanitary administration by the average medical officers.

Communicable diseases, other than the respiratory group, were uncommon. The intestinal infections, typhoid and dysentery, were present, but were so infrequent, as compared with the Spanish-American War, as to be of almost trifling importance. There were reported in the A.E.F. from April, 1917, to December 31, 1919, 1055 cases of typhoid and paratyphoid with 165 deaths. The death rate suggests that not all cases of the diseases were recognized and reported.

There were 1975 cases of dysentery reported, with but 35 deaths.

There were 4860 cases of diphtheria, but only 76 deaths: 950 cases of malaria, with 2 deaths: 9168 primary admissions for measles, with 358 deaths; 24 cases of smallpox, with 5 deaths.

Cerebro-spinal meningitis was highly fatal, 1848 primary admissions causing 802 deaths. There were 2370 cases of scarlet fever, with but 74 deaths.¹

The overshadowing communicable diseases were influenza and pneumonia. In 1918 there were reported 167,141 cases of influenza with 6072 deaths and 20,445 cases of pneumonia with 6481 deaths.² October, 1918, was the month of greatest incidence of these diseases. There were reported in that month 43,643

¹ *The Medical Department of the United States Army in the World War*, IX.

² *Surgeon General's Report* (1919), I, 643-60.

cases of influenza and 7459 cases of pneumonia, with a combined mortality of 6423.

Pediculosis was exceedingly common in the Zone of the Armies and scabies there and elsewhere. All troops were deloused before being allowed to sail for home. Scabies was to a considerable extent a venereal disease, at least in the S.O.S.

Sanitary conditions in the field during combat were exceedingly bad, and in the summer and early fall of 1918 diarrhœa (possibly mild bacillary dysentery) was very common in the divisions at the front. Fortunately, it was usually mild and of brief duration and most cases were not hospitalized. There were 10,933 cases of diarrhœa hospitalized in the entire A.E.F. There were twelve deaths. In view of the conditions existing, the fact that the army was not seriously disabled indicates a high state of sanitary training and consciousness, and generally close attention to chlorination of water.

Venereal diseases were from the first the subject of grave concern to General Pershing, and he took a great and useful interest in their prevention. The problem was aggravated by the fundamental differences of opinion between the French and the Americans as to the best means of prevention and control. The French believed that the legalization and legalized control of prostitution were important and highly desirable, and they acted on that belief. The Americans believed that such measures were pernicious and most undesirable, and they acted on their belief. These contradictory opinions were never brought into accord. The French licensed houses of prostitution and the American command put them 'out of bounds,' set guards to keep out American soldiers, and punished soldiers caught entering or leaving them. In addition, a very vigorous anti-venereal campaign was carried on in many directions. Prophylactic stations were established in all commands, penalties for failure to use prophylaxis and for contracting venereal disease were enforced. Lectures, moving pictures, and other educational measures were used extensively. Amusement centers and educational facilities

were provided to prevent idleness, and, finally, officers and men with venereal disease were not allowed to go home after the armistice until cured, but were kept in France under treatment. General Pershing thus kept his promise to send the men home 'clean.'

The results of all this were very good and the venereal disease rate was extraordinarily low. Nevertheless, there were 57,195 primary admissions for these diseases; the number of days lost from duty was over 1,700,000.

The Division of Laboratories and Infectious Diseases was located at Dijon, under Colonel J. F. Siler, Medical Corps. In the S.O.S. it worked under and reported to the Chief Surgeon, but it also conducted investigations in the Zone of the Armies. It controlled mobile laboratories, the laboratory services, and laboratory supplies through its section of infectious diseases. The section of food and nutrition was similar to that division in the Surgeon General's Office. The Water Supply section was made up of officers and men of the Sanitary Corps and worked with the Water Supply Service of the Engineer Department, which was charged with water supplies.

Let us now return to the First American Army, which General Pershing had formed and trained for open, offensive warfare, in the face of Allied insistence that he use American troops to replace losses in the French and British armies.¹ He loaned them divisions in May, June, and July, because of their pressing needs, but he always insisted on an American Army and offensive warfare, and events justified him abundantly.

The army about to attack the Saint-Mihiel salient numbered about 550,000 men, including attached French troops. The number of hospital beds in the A.E.F. was about 60,000 and approximately five sixths of them were occupied. Assuming that the German resistance would be as stiff as it had been in the June and July fighting, it seemed probable that there would soon be

¹ See *American Reinforcement in the World War*, by Thomas G. Frothingham, 8vo. Doubleday, Page & Company, 1927.

120,000 patients for the 60,000 beds. Every effort was made to increase hospital beds as rapidly as possible, with the result that by September 25th there were 85,000 of them. And only 60,000 were occupied, for the enemy, far outnumbered, had made relatively little resistance at Saint-Mihiel on September 12th and 13th and had inflicted less than 7000 casualties, mostly light.¹ But the Americans captured 16,000 prisoners and 443 guns, and showed that they had a real and powerful army. Immediately a large part of that army was shifted to the Meuse-Argonne front to be used in the great offensive scheduled to begin in eleven days. Here it took the position where most resistance was bound to be offered, for the reason that yielding at that part would cause the Germans to lose their rail communication back of their long front and would thus weaken or destroy their entire line. Here the Americans were to make a direct frontal attack, through country long occupied and thoroughly known by the Germans, and strongly fortified and held. Here they did attack on September 26th, and doggedly forward they fought until the armistice came down with a silence, so that the noise in the world could be used elsewhere in jubilation. By that time the Americans had penetrated to Sedan, the great solar plexus of the Western Front, and Germany could no longer shift her divisions from right to left and left to right, could no longer maintain an offensive war.² During this great offensive, the First American Army, grown to more than a million men, was divided into a First and Second Armies, under Generals Liggett and Bullard, General Pershing commanding the army group. Colonel Alexander Stark remained Surgeon of the First Army; Colonel C. R. Reynolds became Surgeon of the Second Army.

The American battle casualties were 50,280 battle deaths, 205,600 wounded, 4526 taken prisoners. During the period of greatest battle casualties there had also been a very severe in-

¹ General John J. Pershing: *Report*.

² General John J. Pershing: *Final Report*. Washington, Government Printing Office, 1920.

fluenza epidemic. The lightly wounded and lightly sick were returned to duty as rapidly as possible, and on November 12th but 193,026 of the 276,347 total ¹ beds, in 153 base hospitals, 66 camp hospitals, and 12 convalescent camps were occupied. But what a job it had been for the Medical Department! The next chapter will be an attempt to make a picture of the work.

¹ Each hospital was prepared for 'crisis expansion' by the preparation of cots and bedding under tentage or in buildings not otherwise fitted up for permanent hospitalization. These 'emergency beds' sometimes exceeded in number the normal bed capacity of the hospital. In times of stress the less serious cases were placed in emergency beds. At the time of signing of the armistice, the 'normal' beds in the A.E.F. numbered 192,844.

CHAPTER XV

THE A.E.F. (*continued*)

I. EVACUATION OF SICK AND WOUNDED

AN interesting study of evacuation in the A.E.F. was made after the war by Colonel Thomas L. Rhoads,¹ M.C., who succeeded Colonel Stark as Army Surgeon, First Army, A.E.F., after the armistice. This study was based upon large personal observation and subsequent work at the War College. The general narrative here recorded is mainly derived therefrom. The strength of the Medical Department in France should have been 14.5 per cent of that of the total force, a figure considerably higher than that which would be necessary in a purely defensive war fought on home territory. As stated previously, the proportion was never approximated. The strain was dangerous and line troops had to be drawn upon for assistance in evacuation, and units at the base were depleted of personnel in order to help out combat units during battle.

The evacuation of wounded begins on the field, where members of the regimental medical detachment apply first-aid dressings and direct, assist, or carry the wounded men to aid stations. There regimental medical officers apply dressings and splints to prepare the patient for transport. The regimental medical detachments of fifty-five officers and men were not large enough to perform all these duties in times of heavy combat and eight to twelve soldiers had to be withdrawn from each company to assist in the work. Litter-bearers from ambulance companies took the patients from aid stations to ambulance heads or collecting station, ordinarily the most advanced points which could be reached by ambulances; although whenever possible these went all the way to aid stations and thus reduced the heavy labor of litter-bearing. The headquarters of the ambulance company, where the bulk of its

¹ *Military Surgeon*, 1924, LIV.

ambulances were stationed, was usually about a mile to the rear of the ambulance head. When a loaded ambulance passed there on its road to the field hospitals, an empty one started forward to replace it, and constant circulation was thus kept up until the field was cleared.

About five miles back of the front line and outside the area of the most intense artillery fire, two field hospitals were set up side by side as soon as wounded began to arrive, the other two belonging to the division being held in readiness to advance and open farther forward, as the lines advanced. The field hospitals of the World War were places where only emergency surgery was done, wounds redressed and splints reapplied, pain relieved, nourishment given, shock treated, and the patient prepared for further progress toward the rear. All cases arriving here were sorted or 'triaged,' as gassed cases, slightly wounded, seriously wounded, ordinary sickness, contagious sickness. Here exhausted or 'shell-shocked' men were rested, fed, and either sent back to their organizations, after a few hours, or evacuated to the rear. Men too desperately wounded to be able to stand transportation further were kept here unless a mobile (surgical) hospital had been established close at hand, in which case they were sent to it and remained in it until it had to move, by which time, if not dead, they were transferable to the evacuation hospital. The field hospitals marked the limit of evacuation by divisional medical troops. From twelve to twenty miles back of these, occasionally much more, and on railway sidings connecting with a main line leading to the S.O.S., were located the evacuation hospitals, much better equipped and larger institutions with women nurses, wherein the wounded were given more thorough care than they had yet had, operated upon if necessary, rested, and fed, and from which they were evacuated by rail to the S.O.S. They were transported from field hospital to evacuation hospital by ambulances belonging to the corps or the army. There was never a full allowance of either evacuation hospitals or ambulances, and, as a continually advancing line left continually full evacuation

hospitals farther behind, the length of this haul increased. 'At times the distances between field hospitals and evacuation hospitals amounted to over fifty miles, over stretches of shell-torn and muddy roads that made progress almost impossible: during the Argonne offensive the average one-way haul of the army corps and army ambulance service under such conditions amounted to nearly twenty-eight miles for over 24,000 trips.' As the authorized allowance of ambulances was based on the shorter haul, and was never obtained, divisional transportation had to be called upon to help evacuate the field hospitals. 'In the peak of the acute shortage fifteen sections of the U.S. Ambulance Service of twelve ambulances each had to be secured from the Italian Government, and thirty sight-seeing buses with a seating capacity of thirty per bus were obtained from the French Government, in addition to nine French sanitary sections of fifteen ambulances each previously borrowed: and there was still a deficiency of over five hundred ambulances in the big army, which exceeded one million men.

'The situation was complicated by an equal shortage in the number of evacuation hospitals and the enforced wide dispersion of these installations to cover the front. The allowance of evacuation hospitals was contemplated at two for each division, but, as in the case of ambulance companies and for the same reasons,¹ the allowance was never reached or even approached. As division was added to division in the expanding army, the growth of the fighting forces outstripped the means of the small evacuation hospitals, and it became necessary to substitute field hospitals, mobile hospitals, and base units in lieu of others; when these did not suffice the army had to rely on Red Cross hospitals and on French installations to perform evacuation hospital duty. The substituted field hospitals were at times taken from divisions, to the detriment of the service of these units. With all these make-

¹ The reason for shortage in various auxiliary services is told by General Pershing in his *Final Report*, pages 25 to 30. At the very earnest solicitation of the Allies, troop shipments in May, June, and July of 1918, were limited almost entirely to infantry and machine-gun units.

shift arrangements the provisions of patient capacity in the hospital units in the army corps and the army zones for the American offensive in the Argonne still amounted to only 18,000. Considering the number of divisions engaged (22), the patient capacity in evacuation hospitals should have been more than double this number.¹ The situation was made more difficult by the setting aside, at the request of the consultants, of special hospitals for special classes of diseases and injuries, and the evacuation of patients to these from field hospitals, which necessitated long hauls, crossing trails, and circuitous routes.

The personnel of evacuation hospitals was aided by surgical teams in times of stress, so that many operating rooms could be kept running.

From evacuation hospitals to base hospitals the patients were moved by hospital trains from the S.O.S., assigned by G-4 at G.H.Q. to the regulating officer for operation. An almost continuous line of trains removed patients from the few evacuation hospitals so as to allow the latter to keep functioning where they were, but they refilled so rapidly they could not move. Three types of hospital trains were used. Forty-eight fine trains were ordered built in England, but most of them were not received in time to be of use. Fourteen of them were in use during the Argonne operations. These and forty-five borrowed French trains evacuated 143,000 patients during this offensive. Trains of box cars without special fittings were also used for the movement of sitting patients, carrying as many as 1000 or 1500 at a trip. The patients were delivered by trainloads at base hospitals or hospital centers, where for days and weeks the personnel worked at high pitch.

In some of the earlier phases of American fighting, especially at Château-Thierry and Soissons, where American divisions were thrown into the French lines, the Medical Department had no warning of the intended movements, no time to make any preparations. The wounded were taken to Red Cross hospitals,

¹ Rhoads, *Military Surgeon*, 1924, LIV.

private hospitals, and French hospitals in Paris; but there were delay and confusion such as never occurred again, or ever when the Medical Department had warning.

A remarkable thing about the system of evacuation of the wounded was that it was essentially the plan formulated before we went to war. Most other branches re-formed their plans entirely. The infantry division was reorganized from the company up, the Quartermaster's Department was cut into pieces, the General Staff made over, but the Medical Department plan worked well throughout the war. Had the personnel and equipment approached the estimates, it would have worked better still. The most striking departures from the preconceived plan were the use of mobile hospitals and surgical teams, the establishment of the great hospital centers, and the control of evacuation by G-4 at G.H.Q. Not the British, the French, the Germans, or any other army had evolved from their experience a general plan better than ours.

Another thing that was new and was related to evacuation was the use of medical consultants in combat units. Colonel Grisinger expressed a sentiment pretty general in the Medical Corps when he wrote:¹ 'Composed of the best talent the American medical profession afforded, they labored with unceasing energy, with the loftiest ideals, with the keenest possible appreciation of the technical questions involved and with the most inspiring loyalty and coöperation. All they ever lacked was an intimate knowledge at first of military methods and this they picked up with surprising rapidity, especially if they received assistance. . . . The system which provided their attachment to divisions, corps, armies and higher units was a wise one and should by all means be perpetuated.'

Still another interesting fact is that, working for the first time in war under a General Staff, the Medical Department found its advice and its needs receiving more attention than ever before, and was generally well satisfied with its treatment. There were of

¹ *Military Surgeon*, November, 1927, page 590.

course officers who would growl and complain about it, but in the same way as they growled and complained of their superiors in their own corps, of the President and all others in authority. Usually they did not mean it, or, when they did, they sometimes admitted that the faults were largely due to inexperience with a new system.

Along with the fighting came influenza. A battalion surgeon ¹ wrote to his wife:

'I have been back in the line again for several days, and am a little more comfortably situated. But it is a hot place and the Boche constantly pepper us with gas and H.E. (high explosives). The six days I was out was anything but a rest for me. The battalion was all shot to pieces with an epidemic of grippe, and we had as high as 340 at sick call in one day.'

From the report of the medical activities in the 35th Division is extracted the following from the account of the work of September 29, 1918:

'Ambulance Company No. 138: This company, supplemented by the special teams, continued to work at the dressing station (triage) at Cheppy, always under high pressure, dressing, treating and evacuating the steady streams of wounded who poured in, not only from the front, but particularly from the 91st Division on the right as well. Returning ambulances, trucks, wagons, all came down loaded. Walking wounded came through in a steady procession. Extra details of military police were necessary to assist in the control of the heavy traffic about the station. Many cases of so-called shell shock, light gas and exhaustion soon filled the rest hospital to overflowing. Accordingly the Regimental Surgeon of the 110th Engineers was instructed to take over dugouts further east of the station to care for the overflow of ambulatory cases. At noon he reported dugouts ready for 200 cases. These filled at once. At noon, in spite of strenuous efforts towards evacuation, the station was swamped with nearly a thousand cases. All buildings, tents and dugouts were full, the ground

¹ R. H. Hertzler, Newton, Kansas: 'C'est la Guerre.'

about the tents and dugout entrances was covered with litter cases, and the road for a hundred yards was covered with litter cases, three deep. And then the Boche began to increase his artillery fire, which had been more or less constant though light, to the proportions of a bombardment, presumably directed at the batteries which were on both sides and behind the station. Many shells struck directly in front of the triage, in the soft ground bordering the little creek, throwing mud into the station and all over the recumbent wounded. With news from the front that our lines were falling back, that the enemy was preparing to counter-attack and that owing to the road blockades our artillery was running short of ammunition, and that there was a possibility of the enemy breaking through as far as Cheppy, the situation looked serious.

‘Extraordinary efforts were made to get the wounded out. The Commanding Officer of the Military Police, as well as the Division G-1 rendered every possible assistance in getting trucks. In addition the Army and corps trucks were policed and all available ambulances were utilized. A column of walking wounded of about 250 was organized. . . . Between 3 and 5 o'clock, over 750 patients were evacuated to the Field Hospital at Neuville and at the same time over 500 were sent direct from Charpentry to Neuville. The congestion was for the time relieved, and afterward we were able to keep the evacuation rate up to the intake.’

At the field and evacuation hospitals the work was as strenuous. Both were aided by mobile hospitals, which were really mobile operating establishments, and by surgical teams sent up from base hospitals in the rear. With this assistance as many as ten surgical teams operated continuously, at times in day and night shifts of twelve hours. How severe the pressure was on these hospitals at times is shown by the facts that Evacuation Hospital No. 7, at Coulommier, after June 13, 1918, received and evacuated 27,000 cases, and Evacuation Hospital No. 9, at Vaubecourt, during the Argonne operations handled 33,910 cases. On active days 200 patients were operated upon. More than 2000 cases

were evacuated in one day.¹ So it was also back in the base hospitals. The arrival of a trainload of 300 to 500 men, to be unloaded, carried to wards, bedded, bathed, fed, dressed, re-splinted, X-rayed, operated upon, made work for all, and perhaps before the work was done another train was waiting to be unloaded.

These were great times, and as the work proceeded with machine-like regularity, many a medical officer and enlisted man, who had felt that he was wasting time in the long months of training and preparation which had passed, rejoiced that he was now really rendering service, and he worked cheerfully until exhausted, fell out for a time, and worked again. The women nurses did likewise. So skillfully and well did they work that General Hagood wrote:²

'I have already said I thought that our soldiers were better fed, better clothed, and better shod than any other soldiers in Europe. I am absolutely certain that they had better medical attention. In fact, one of the worst things that could be said about a sick or wounded man in France was that he had not yet been taken to the American hospital. To many this sounded almost as bad as to say that he was still lying on the battle-field.'

Veterinary evacuation in general paralleled that of the sick and wounded, although animals that could not be expected to become serviceable within a reasonable (economical) period were disposed of. The proportion of wounded animals evacuated was thus smaller. A larger saving of wounded animals was effected than in previous wars.

The average time elapsing between a man's receipt of a wound and his arrival at a field hospital was five hours, to an evacuation hospital ten hours. The average was lengthened by such facts as the following: (1) Men wounded in trenches could usually be evacuated only at night, which might mean a delay of twelve

¹ *The Medical Department of the United States Army in the World War*, VIII, 157.

² *The Services of Supply*, 346.

hours or more. These men would be placed on cots in trench dressing stations, miniature, subterranean hospitals, there dressed, fed, and made comfortable until darkness came on. (2) Men wounded in the open during battle would crawl or be helped to shell holes and lie there until darkness, sheltered from machine-gun fire, exposure to which would be almost certainly fatal. (3) The roads were often destroyed by shell fire or blocked for miles by trucks, causing prolonged delays of ambulances. (4) Sometimes the whole distance to the field hospitals was by hand-carriage, especially if there were prisoners available and shortage of ambulances.¹

The record of evacuation was in general so good that there is a possibility that it may lead to failure on future occasions, unless we bear in mind that we often had the use of ambulances, evacuation hospitals, hospital trains, and personnel belonging to the French and that our own provision of all of these was inadequate. It is believed that the reasons for the inadequacy are all contained in General Pershing's statement as to shipments in May, June, and July.²

Another matter to be borne in mind for the future is that evacuation was controlled almost entirely by a section of the General Staff, G-4 at G.H.Q., almost independently of the Chief Surgeon and the army surgeons. It worked excellently, because of the ability of the medical officers in or attached to that section, of the complete responsibility entrusted to them by the chief of the section, General Moseley, and of their loyalty to the Chief Surgeon; but the organization which puts juniors in independent control of great matters for which their seniors are responsible must depend for successful working on the personalities, ability, and loyalty of the juniors and is not believed to be the most desirable form of organization.

Possibly General Ireland had this in mind when he said in an address to a class at the War College:³

¹ Report of G-4, 'B,' A.E.F.

² See page 342.

³ *Military Surgeon*, May, 1928, page 573.

'The Medical Service at General Headquarters. The chief surgeon of a field force, having been selected, becomes by virtue of his office, a member of the technical, supply, and administrative staff of the Commander-in-Chief of the field forces. Under the commander-in-chief, he controls the Medical Department activities within the Theater of Operations through the coördination of the General Staff at G.H.Q. The functions of the Medical Department are so intimately connected with combat activities that its primary classification as a supply service is unwarranted. The providing of medical supplies is but a small part of its many functions. It is, therefore, necessary that the chief surgeon maintain his office, with a minimum of personnel, at General Headquarters and keep in close touch with the commander-in-chief and his General Staff.

'Staff Relationship. As G.H.Q. is concerned with broad matters of policy and strategy rather than with the details of administration and operation, the chief surgeon's office is organized so as to fulfill its staff functions chiefly through direct coöperation with divisions of the General Staff. If the General Staff organization is perfect, all matters involving the Medical Department which require staff coördination at these headquarters will naturally fall into one or the other of the divisions of the General Staff. Therefore, it seems the part of wisdom to so organize the chief surgeon's office that it will function parallel with the General Staff divisions. For this purpose a medical officer or a group of officers may be assigned to maintain immediate liaison with each division of the General Staff at G.H.Q. In the World War these officers were assigned to the General Staff, but in the future it seems to me that they should remain representatives of the chief surgeon and retain their status as Medical Department officers. Questions arising within all divisions of the staff that in any way affect the Medical Department, should come before these officers before finally being decided, and their decisions and advice should be in consonance with the policies of the chief surgeon. So much of all plans for the future as affect the Medical Department, and

nearly all plans do in one way or another, must be given in confidence to these officers in order that they may keep the chief surgeon informed along lines where the commander-in-chief will expect him to obtain results. Unless this advance information is given to the chief surgeon he will be unable to accomplish his mission of maintaining the fighting strength.

'The Chief Surgeon's Office at G.H.Q. can, therefore, be conducted by a small group of officers, namely the Chief Surgeon, his principal assistant, medical officers in liaison with the General Staff, the chief veterinarian, the chief of professional services, and one or more general medical inspectors. The execution of policies and the administrative details incident thereto become the responsibility of the Communications Zone and the Armies.

'Directly under the control of G.H.Q. are two installations with which the Medical Department is especially concerned. I refer to the Medical Department Concentration Center and the Regulating Stations. The Concentration Center is an institution established in the Theater of Operations where medical and veterinary units may be received and conditioned, concentrated after withdrawal from the line for the purpose of overhauling and refitting and where certain hospitals and the auxiliary surgical groups can be held in a pool in readiness for service where most needed in time of major activity. Most of these units at Concentration Centers become in reality G.H.Q. Reserves. Recently upon my recommendation, two surgical and three evacuation hospitals were taken away from the organization of each type army. Of the total thus released from six field armies, six of each were dropped entirely and six surgical and twelve evacuation hospitals were pooled in G.H.Q. Reserve. We thus effected a material saving in personnel and material and are at the same time still in position to give as good if not better service.

'As the Regulating Stations function directly under G.H.Q., the medical group attached thereto will receive from the chief surgeon of the field forces such general oversight as is necessary in the formulation of the broad policy involving evacuation and consequent hospitalization.'

II. COMPLICATIONS

There were certain complications of the war, not truly a part of the German sickness for which the world was being treated, but nevertheless ills causing suffering, threatening the recovery of the patient, and demanding vigorous treatment. Like a fibrinous pleurisy complicating a pneumonia, Bolshevism did not immediately threaten the world's life, but it caused suffering, and fear that it might progress to become a fatal empyema. Like the doctors of a century ago, the consulting statesmen decided that counter-irritation and blood-letting were indicated. These were applied by means of expeditions to Archangel and to Eastern Siberia. They were not effective in preventing the development of empyema, but it was localized and not fatal; so who shall say that the blisters and the blood-letting were useless?

ARCHANGEL

In August, 1918, an American force of 143 officers and 4334 men was sent to Archangel, where it served under British command and was spread over a front of 450 miles and a territory of about 15,000 square miles. From September, 1918, to May, 1919, a number of minor engagements resulted in eighty-two deaths in battle and seven later from wounds.

The total hospital admissions were 2352, deaths in hospital 104. Over five hundred patients were evacuated to Archangel by sleds in the winter of 1918-19, at a speed often not greater than two or three miles an hour, distances of 110 to 230 miles. The men were transported in sleeping-bags. They kept comfortably warm and in many instances improved on the long trip, even with the temperature as low as fifty degrees below zero. Naturally the wide dispersion of the troops made the work of the Medical Department very difficult. Influenza was the most important disease. There were 378 cases in September, 1918, with sixty deaths.

The force was withdrawn in the summer of 1919.

SIBERIA

In August, 1918, an American expedition was also sent to Eastern Siberia, to coöperate with Japanese and Czecho-Slovakian forces in clearing the region of Bolshevik bands. The force numbered 8831, the Medical Department personnel 698 officers and men. The base was Vladivostok, although troops were stationed as far as 1700 miles from that city, on the railway. The long evacuation line required a hospital train. The first one was extemporized by fitting bunks in box cars, but when cold weather came this was replaced by a train of compartment cars. Up to the time of its closing at the end of March, 1920, the evacuation hospital (really a base hospital) had 8100 admissions and eighty-six deaths.

MEDICAL AND SURGICAL

Encephalitis lethargica. A disease of later great importance which appeared during the war is encephalitis lethargica. Why or in what manner this disease should be related to the war is unknown, but the time relation is clear. Possibly the disease existed in earlier times, and writers upon it have dug up such a history which seems to satisfy them, but to the medical world in general it was a new thing.

First described by von Economo in Austria, it was soon recognized in other countries and it is now widely spread, possibly as common as poliomyelitis and even more to be dreaded. Few, apparently, are the victims who recover entirely. Many are the deaths, but still more numerous the conduct disorders, the disturbances of personality, and the instances of progressive, relentless Parkinsonism, the syndrome formerly regarded as pathognomonic of Parkinson's disease or paralysis agitans.

To all intents and purposes it is a new disease, of war-time origin and distribution, although not particularly a disease of armies. At first regarded as a manifestation or modality of influenza, it is not now thought to be related to that disease.

Trench Fever. The British Army and to a less degree the

French, the Italian, the German, and the Austrian armies suffered from a disease which came to be known in English as 'trench fever.' The number of cases reported in our army was small, which may be partly accounted for by the facts that it was unknown to our doctors, that it was not ordinarily either severe or prolonged, and that the clinical picture is not clear-cut and distinctive. The Medical Research Committee of the American Red Cross investigated it thoroughly and concluded:

(1) That trench fever is a specific, infectious disease; that it is not a modified form of typhoid or paratyphoid fever, and not related to these diseases.

(2) That the organism causing the disease is a resistant filterable virus.

(3) That the virus is present particularly in the plasma of the blood of trench fever cases, and that such plasma will produce the disease on inoculation into healthy individuals.

(4) That the disease is transmitted naturally by the body louse, and that this is the important and common means of transmission. Infection may be conveyed by the bite of the louse or by rubbing excrement from an infected louse into an abrasion.

(5) The virus may be present in the urine or the sputum of infected men and the disease may be produced by its introduction through the skin in these media.

This was about the worst the louse did on the Western Front, but the typhus epidemics in Russia, Poland, German prison camps, and elsewhere were also his work, or hers.

Trench Foot. This was a condition characterized by pain, burning, redness and cyanosis of the feet, due to prolonged exposure of the feet to cold and wetness, particularly if the circulation in them was at the same time interfered with by pressure from shrinking puttees. The condition was a sort of major chilblain. In some cases there were superadded local infections. Some tetanus arose from trench feet, and tetanus antitoxin was prescribed as part of the treatment.

Our men suffered from it relatively little, partly because forewarned. The total number of cases reported was 2064.

SURGERY

The World War was notable for the large proportion of shell wounds and of highly destructive bullet wounds as compared with the Spanish-American War. Destruction of tissue was often great and infections were very common. Tetanus antitoxin was a part of the routine treatment of all wounds and gas gangrene was not the rare complication it was formerly considered. A polyvalent antitoxic serum to combat gas gangrene was developed, but the benefits from it are not generally believed to have been great. Two notable features of wound treatment which came into general use and were thought very valuable were *débridement*, the cutting away of dead, detached, and contused tissue, and antiseptic treatment with chlorine solutions, especially the Carrel-Dakin solution.

Surgical shock was a matter of great importance which received much study and more speculation. It was of two general types: immediate shock, in which disturbance of the nervous system was an important factor, and late shock, in which liberation and absorption of toxic products of cell destruction seemed to be largely to blame. Measures of treatment which all investigators found of value were rest, the application of external heat, blood transfusion from suitable donors, careful anæsthesia and early operation.

Abdominal operations were done more frequently than in former wars and many more cases were saved, but the mortality from abdominal wounds was still very high.

Wounds of bones and joints were very numerous and severe, but amputations, although amounting altogether to 4403, were relatively rare, and the large majority of bone and joint cases were restored to functional usefulness. Here was the great step forward of orthopedic surgery. Many amputations were necessitated by infections, particularly that of gas gangrene.

LICE

Numerous as were the combatants in the Great War, they were infinitely outnumbered by the lice, and the delousing plant,

where he could get a bath and clean clothing that had been deloused since some other man had used it, was not an institution to be ignored by the man who had been in the front lines. A bath of bay rum or of talcum powder, taken in a dugout in intervals of fighting, might improve the warrior odor, but it did not stop the itching and the crawling. Only a hospital or a delousing plant had means effective for the relief of these symptoms. Although it may seem like damning the Medical Department of his own division with faint praise, the following paragraph of Colonel Grissinger's has such a ring as to suggest that it comes from the bottom of a grateful heart, and it is therefore quoted:

'I know of no other thing that the medical department of the division did that gave so much real comfort and added so much to the morale of the troops as this systematic bathing and delousing.'

CENSORSHIP

Akin to the lice, but not so easily gotten rid of, was the censorship, the well-meant, annoying, often futile censorship, which would not allow a man to head his letters from a town, a place, or an organization, but which kept almost nothing secret. The soldier knew nothing of troop movements if he had desired to tell of them. General Hagood relates that when he, as Chief of Staff, S.O.S., went up into Brittany with the secret preparations for the Saint-Mihiel drive locked in his bosom, a French civilian in a restaurant told him of the plans. Colonel Grissinger tells of the relief of the 42d Division from a trench sector by the 77th:

'The usual attempt at secrecy was made so that the enemy would not learn of the impending change. That it was not wholly successful is evidenced by the fact that while the movement was under way a German airplane flew over our lines dropping a note which read: "Good-by, Forty-Second — Welcome Seventy-Seventh."'

As a part of the censorship scheme, letters from home were

* Grissinger, Colonel Jay W.: 'Field Service,' *Military Surgeon*, Vols. 61, 62.

addressed to numbered stations, and organizations left these for parts unknown to the Post Office Department or to the S.O.S. In consequence letters might reach the man for whom they were meant in three weeks, three months, six months, or never. It did not make for happiness, nor for the welfare of the sick and wounded.

DESERTIONS TO THE FRONT

Colonel Leonard P. Ayers tells us¹ that 'among the 10,709 other casualties' there is one most interesting and not inconsiderable group, some of the members of which are included in 'troops not in divisions' and the rest among the casualties of replacement and depot divisions. 'These are the men who deserted to the front. They went A.W.O.L. (absent without leave) from their organizations in the zone of supplies or in the training areas, and found their way to the battle-line, where many of them took part in the fighting and some of them were killed or wounded.'

Among these deserters to the front was a young friend of the writer's, whose case is perhaps typical of many. Graduating from a Western college just as a hospital unit was being organized by the institution, he joined it with many of his classmates. A love for amateur cookery and considerable experience in camp life and camp cookery made his detail as a cook an early development. As a cook he went to France, as a cook for the officers' mess he served until the developments of September and early October, 1918, made it apparent that the war would not last forever. This ardent young man, an outdoor person, could not enjoy the thought that his whole war service was to consist of cooking, especially of cooking for officers. A friend looked at the matter in the same light, so they 'borrowed' an old Ford car from a dump, repaired it sufficiently to make it run, and departed for the front without undue publicity. They had some amusing adventures, saw two weeks of real war, and, when the armistice was signed, returned to their hospital and were confined as deserters.

¹ *The War with Germany*, 117. Government Printing Office, 1919.

They sent out a Macedonian call, but, ás Colonel Ayers's statement shows, help was not really necessary. It was not the kind of desertion for which military courts are likely to award severe punishments, so the young man still lives to run a newspaper column and to find life interesting and enjoyable in many ways.

III. SEQUELÆ

Only a few immediate sequelæ of the war will be mentioned here, for the end is not yet and the subject is too vast. The great immediate sequels were the surrender of Russia to the Central Powers and, later, that of the Central Powers to the Allies; the political revolutions which changed the forms of government in Russia, Germany, Austria, and Turkey; the new states and new boundaries to old states prescribed by the Versailles Treaty. Possibly the formation of the League of Nations may eventually prove to have been the most important sequel of all, or it may prove unimportant.

THE MARCH INTO GERMANY

Of minor importance, but more closely related to our story, was the advance of the Third American Army into Germany. As related earlier, the Second American Army was formed during the Argonne offensive by division of the unwieldy First Army.

'In accordance with the terms of the Armistice the Allies were to occupy all German territory west of the Rhine, with bridge-heads of thirty kilometer radius at Cologne, Coblenz, and Mayence. The zone assigned the American command was the bridgehead of Coblenz and the district of Treves. Various reasons made it undesirable to employ either the First or the Second Army as the Army of Occupation. Plans had been made before the Armistice to organize a Third Army and, on November 14, this army, with Major General Joseph T. Dickman as commander, was designated as the Army of Occupation.'¹

Colonel Jay W. Grissinger, M.C., was made Army Surgeon.

¹ Pershing: *Final Report*.

The force of some 200,000 men began its advance on November 17th and reached the Rhine on December 9th. The march offered difficulties to the Medical Department. In order for the Third Army command to have complete control of all facilities, it was decided to take along only evacuation hospitals, using them as base hospitals. It was planned to locate one of them in Luxembourg, but the plan was vetoed by the French. Sick with the command were primarily evacuated to Toul and Verdun. Evacuation Hospital No. 18 was moved to Briey on November 24th and Numbers 3 and 12 reached Treves on December 2d. In the mean time the corps and division field hospitals had had to care for all patients. The railroads were disorganized, so that no hospital train could get forward until December 1st, when one reached Briey. Insufficient hospitals and long ambulance hauls were the rule until December 2d, when the hospitals were established at Treves and a hospital train began the work of evacuation. By December 10th, hospitals with 4100 beds were located in Coblenz. Others were brought up and established until there were in all 8600 beds. A general order covering all evacuation was published on December 20th.¹

The war was not technically ended, and 'fraternizing' with the Germans was forbidden, but the Germans seemed more like home folks than had the French; they were as war weary and glad to see Americans; they hoped for remote benefits from American good will and immediate benefits from liberal American spending. Their currency was becoming more and more worthless and the American soldier's pay was big money when converted into marks. The American himself was tired of war, keen to experience the sensations of a millionaire and to act like one, so he spent and he fraternized, he enjoyed wines and *fräuleins* at ridiculously low figures, and his venereal rate surpassed that of the armies in the A.E.F. or at home.

Some men fraternized more seriously and acquired German wives, even families, who are now good Americans.

¹ *The Medical Department of the United States Army in the World War, VIII.*

The thought of these German wives suggests memories of the French wives acquired by some medical officers, sensible, cultured, charming ladies who still adorn the distaff side of the Corps personnel and help to make pleasant the life of their husbands' stations. The war was not wholly evil. Some men acquired fame, some fortune, some good wives. Many more lived through great experiences and learned to look at life and death calmly and fearlessly, and that is no small thing.

The Medical Department came through it with enhanced credit at home and abroad, with the Army and with the medical profession. The best proof of enhanced credit with the Army is found in the interest of the General Staff and the line in the work of the Medical Department and their willingness to promote it.

An excellent proof of standing with the medical profession is found in the honorary memberships in the American College of Physicians, the American College of Surgeons, and other professional organizations of high character, granted to Army medical officers, and the fact that Surgeon General Ireland, not an operating surgeon, was this year (1928) elected President of the American College of Surgeons.

PART SIX

FROM THE WORLD WAR TO 1928

I have but one lamp by which my feet are guided,
and that is the lamp of experience. I know no way
of judging the future but by the past.

PATRICK HENRY

PART SIX

FROM THE WORLD WAR TO 1928

CHAPTER XVI

SOME HISTORY OF THE PERIOD

JUST as the diagnostician is greatly aided by the lapse of time in his estimate of the relative importance of symptoms and signs which in the long run indicate the condition, the needs and the probable future progress of his patient, so is the historian aided by the growth to completeness of the picture which he is studying, a growth for which time is necessary. Things are not always just what they seem at the time, and that fact adds zest and interest to history, medicine, politics, and life itself. For this reason the final section of this history of the Medical Department is undertaken with greater diffidence than the preceding sections, is perhaps more influenced by prejudices and prepossessions, and it will be written with a more definite effort to record only facts, and to avoid deducing opinions. This will be the more difficult as opinions on recent events are likely to be held and to press for expression with a warmth which is in somewhat inverse proportion to the completeness of our understanding of the events. It is not difficult to keep cool about the opinions and events of 1861, although the recollection of the occurrence of the same events or of the expression of the same opinions in 1927 might cause enthusiasm or indignation, in either event perversion of judgment.

The Bolshevik régime in Russia affords an example. Conceivably, it may in time be viewed as philosophically as the French Revolution, but the time has not yet come. None the less, the Bolshevik régime has in one way or another influenced the whole world. Viewed with general alarm and horror because of its excesses, its terrors, the immense cruelty, injustice, and suffering which it entailed, and particularly because of its avowedly inter-

national aims, it was combated by all other nations. At first the opposition was armed, and, as shown in a preceding section, our own country sent expeditions to Archangel and to Siberia, aiding the anti-Bolshevist Russians in the former and the Czecho-Slovakians in the latter expedition. In general, the armed opposition failed to weaken Bolshevism, and in some respects actually strengthened it, by causing Russians to unite against foreign aggression. Thereafter and up to the present time the opposition has been verbal, diplomatic, and economic, and usually opportunist, yielding, as did the Bolsheviki themselves, under pressure of necessity or self-interest. The fear of Bolshevism has perhaps exceeded its dangers. For a few years persons high in Army position expressed great fear that there was permeation of the Army by Bolshevik doctrines and urged systematic efforts to combat them. Apparently the fear and presumably the danger have passed.

With the signing of the armistice on November 11, 1918, the World War virtually ended, as neither of the Central Powers resumed combat thereafter. At once there began the usual *post-bellum* demands for the discharge of the troops and their return home, and preparations for this were started, but the return was not made prematurely.

The Peace Conference met in Paris on January 12, 1919. President Wilson personally headed the delegation from this country and fought throughout the long period of negotiation for the embodiment in the treaty of his ideals, particularly for the formation of a League of Nations which should smooth out or adjudicate questions in dispute between nations, and so eliminate many causes of war, and which should also serve to bring to bear compulsion upon recalcitrant nations and thus keep them from going to war. This he succeeded in getting, but only at the cost of yielding on many other matters concerning which he was not in sympathy with the representatives from other countries. The Treaty of Versailles was a compromise, not wholly satisfactory to any nation and very unsatisfactory to some. Meanwhile,

partisan politics in America, relatively quiescent during the war period, became very lively and the League of Nations and the Versailles Treaty were made partisan issues. All those persons discontented with the aims, conduct, and progress of the war, all inimical to Mr. Wilson and his party, and that large part of the population which looked upon the League as an entangling alliance and a departure from the soundest policy of the nation were united against Mr. Wilson, his party, and his policies. Both the League and the Treaty failed to receive the needed approval from the Senate which would assure our participation in them; the other nations accepted them and we were left in the anomalous position of being at war with Germany and Austria after our recent allies had made peace. In three successive presidential elections the Democrats were soundly trounced, and we yet have official shivers at the thought of acknowledging that the League of Nations exists and functions. A treaty of peace with Germany was signed on July 2, 1921, although peace had actually existed for a year and a half. America not being a signatory of the Versailles Treaty, our Army of Occupation in Germany was not supposed to be concerned with its enforcement, and was withdrawn when we were given satisfactory guarantees of reimbursement for its cost there.

During this period of uncertainty as to many things, there was also great uncertainty as to the future, the size, the functions, and the composition of the Army. Many of our people, an even higher proportion of Army officers and the members of the General Staff, especially, were in favor of universal military training. The War Department presented to Congress a bill for a large standing army, of 500,000 men. Congress held long hearings on the subject, and compromised by rejecting both universal training and the large standing army and authorizing an army of 280,000 men, with an organization into brigades, divisions, corps located in corps areas, and armies when the President deems this expedient, and a medical service prescribed on a percentage basis.

The act approved June 4, 1920, which did this, also made other

extensive additions and amendments to the National Defense Act, among these being a provision that a board of general officers should prepare an initial list of officers eligible for appointment to the General Staff, eligibility being limited to: '(a) Those officers graduated from the Army Staff College or the Army War College prior to July 1, 1917, who, upon graduation, were specifically recommended for duty as commander or chief of staff of a division or higher tactical unit, or for detail in the General Staff Corps. (b) Those officers who, since April 6, 1917, have commanded a division or higher tactical unit, or have demonstrated by actual service in the World War that they are qualified for General Staff duty.' An act of May 21, 1928, amended this to make eligible properly selected later graduates of the Leavenworth School and [or] the War College.

Under those provisions schooling is a *sine qua non* of future selection to service on the General Staff or in command. The successive passage through post schools, special service schools, Fort Leavenworth, and the War College requires years. Interspersed with those years will be other years as instructor of National Guard or organized reserves, of college students and civilian military training camps, of details to staff departments, and of service 'with troops,' a part of which means actual duty with companies, battalions, and regiments. The tendency of this last to be small is inevitable, because of the small size of the army and the comparatively large number of officers. As the result of all this it is probable that the average officer of the future will be much better educated, more scholarly, but he will have had less contact with troops. The 'scholar in politics' is still considered something of an anomaly. It is interesting to speculate upon what the Army will be if all of its officers become scholars, or if it should undergo another possible development, the division of officers into two classes, the scholars and those who serve with troops.

An important feature of this bill was the establishment of the 'single list' for promotion, in lieu of the old method of promotion

only in arms or corps. With foresight which many people did not appreciate, the Surgeon General managed to keep the Medical Department off of this single list and to secure for it a system of promotion by length of service, the advances for the Medical and Dental Corps coming as follows, subject of course to promotion examinations: to captain after three years' service, to major after twelve years, to lieutenant colonel after twenty years, to colonel after twenty-six years. This provision caught a number of officers with one foot raised to step into promotions due under the old law. They were naturally surprised and grieved, and felt that the Surgeon General had made a grave mistake, an opinion which strengthened as they saw line officers whom they had ranked go ahead of them. However, at the present time there is a strong effort to get the same sort of promotion for the single-list officers. Furthermore, the officers who were left with one foot in the air have all taken their step and there is a general tendency to regard the Surgeon General's action as wise.

Another important feature of this bill was the omission of the Sanitary Corps and the substitution in its stead of the Medical Administrative Corps. The Sanitary Corps, formed early in the war, had served to include all that non-medical personnel which was found necessary to the greatly expanded work of the Medical Department, such as special accountants, sanitary engineers, psychologists, nutrition experts, social hygiene workers, as well as adjutants, quartermasters, transportation officers, and registrars in large hospitals and sanitary trains, and property officers in medical supply depots. The Medical Administrative Corps, with promotion restricted to the grade of captain, provided for the latter group only, adjutants, quartermasters, etc., who were to be selected from among the enlisted men of the Medical Department, as was largely the case during the war. As it was desirable to keep a reserve of the other classes, many of higher rank than captain, place was found for them in the Quartermaster's Reserve Corps until a Sanitary Reserve Corps in the Medical Department was created by the President.

The usefulness of the Medical Administrative Corps has been proved by its work. The method of appointment assures that its personnel is selected on merit, and it is very pleasing to be able thus to reward capacity and good work of enlisted men.

The Army by this act was to consist of the Regular Army, the Federalized National Guard, and the Organized Reserves, the principal function of the Regular Army to be instruction and training. Again the United States had a military policy, this time more elaborate and detailed than that of the National Defense Act of 1916, and it still has on paper. The policy was left on paper and partly nullified by the simple expedient of refusal of the money necessary to put it into full effect. Congress appropriated enough money in 1920 for 280,000 enlisted men. In 1921, the mean strength was 207,000; in 1922, 147,000; in 1923, 131,000; in 1924, 136,000; in 1926 and 1927, 133,000.

The demobilization of the great war army necessitated the recruitment of new personnel to keep the Regular Army going. Requirements for enlistment were lowered, great inducements, in the shape of promises of education and vocational training, were held out, enlistments for one year accepted, and the Army was filled with a very unsatisfactory enlisted personnel. In 1920, the Surgeon General said, as the result of reports received from medical officers: '(1) That the class of men now applying for enlistment is inferior physically and mentally to that of pre-war times; (2) that the reason for this physical inferiority is largely the immaturity of the applicants, the age limit having been lowered to 18 years and consent of parent or guardian no longer being necessary; (3) that line recruiting officers at general recruiting stations do not use sufficient care in determining the authenticity of birth certificates and other evidences offered by applicants as proof of their legal age.' Any one who dealt with many of the boys and defectives then enlisted and heard their stories of the promises of 'go-getter' recruiting officers and sergeants may well wonder that (or if) we had any good men. When it is considered that, in addition to this handicap, a large proportion

of officers were discontented because unable to adjust themselves gracefully to the small tasks of post life, after two years of engrossing work at large tasks, many disgruntled and in relatively straitened circumstances because of demotion, it is not surprising that Army morale was low in many respects. Such was the case. One exception to the general rule was the Nurse Corps, which in 1920 received relative rank and increase of pay. Some members felt their oats and pranced, but most of them kept as solidly on earth and were as useful as ever. At the end of 1919, Miss Dora E. Thompson, who had quietly and efficiently performed the duties of Superintendent of Nurses all during the war, resigned that position and was very justly awarded the Distinguished Service Medal. She became Assistant Superintendent and was sent to Manila, being succeeded as Superintendent by Julia C. Stimson, who has since held the position. Mention of Miss Thompson suggests Bessie S. Bell, who was Chief Nurse in the A.E.F. during most of the war; and did her work with the same quiet efficiency as Miss Thompson, a quiet efficiency such that both women so blended with the team that they have to be grabbed, as it were, and dragged into view.

The War Department Appropriation Act of June 4, 1922, provided: 'That on and after January 1, 1923, there shall be officers as now authorized by law except that there shall be . . . nine hundred and eighty-three officers of the Medical Corps, one hundred and fifty-eight officers of the Dental Corps, one hundred and twenty-six officers of the Veterinary Corps, seventy-two officers of the Medical Administrative Corps. . . .' The numbers of officers of the other staff corps and of the line of the Army were also reduced and it became necessary to discharge or retire great numbers. The Medical Corps lost 167 officers, the Dental Corps 75, the Veterinary 33, the Medical Administrative 66. Those who had to be let out were selected by a board of general officers, who examined the records of all officers. So great was the reduction that it could not be limited to disabled and unfit officers, and many good men were let out, some of them men of unusual ability

in certain lines. It was a heart-breaking thing for them and very discouraging to other officers, as nobody knew when or where the next blow might fall. It was also very disturbing to the work of the Army. When these men were discharged, the general hospitals contained thousands of patients, many of them wounded from overseas, and the Surgeon General in his Annual Report for 1921 had said: 'The present personnel is barely adequate to properly perform the functions of the department with the Regular Army, leaving few if any officers available for the care of the beneficiaries of the Veterans' Bureau or for duty with training units of the National Guard, Organized Reserves, and Reserve Officers' Training Corps, and at training camps.' On top of that came the reduction, since which time the Medical Department has been sadly overworked. It carries on successfully by virtue of overwork. It can overwork more or less cheerfully because its work is interesting, various, and necessary, but man or beast can be overexploited, and the philosophy which teaches the unprofitableness of working a willing horse to death would again appear applicable, as in the past.

Of possible great importance in the general treatment of the Army was the attitude of the demobilized men after the war. Never in the thirty years of the writer's service has the Army enjoyed so little popular esteem, felt so much popular dislike and depreciation, as in the early years after demobilization, from the end of 1919 to 1922 or 1923. No attempt will be made to explain the fact. It is simply chronicled along with the other fact that demobilized men were among its most vigorous detractors, and that the detraction followed the greatest and most successful job the Army had ever performed. But this has passed.

In spite of small appropriations and reduced personnel, the military policy is being carried out just as far as possible. The Army of the United States consists of its three lines, the Regular Army, the National Guard, and the Organized Reserves. The Regular Army is engaged in teaching just as far as its various other duties will permit; the National Guard and the Reserve

Officers devote an amount of time and work to their military education which is surprising. It is difficult to understand how they can take so much time from their businesses and their recreations as they find to give to military matters. By reason of this interest and work, they are efficient to a higher degree than any civilian soldiers the country has ever known, and there is every reason to expect that, should war come again, they will prove of very great value. Speaking only of the Medical Departments of the National Guard and the Reserve, with which he has had far more contact than with other branches, the writer views those of them whom he has met in schools and camps since the war, their work, their interest and devotion, with admiration and no small wonder. With the aid of such men the Medical Department need fear no failure that intelligence, training, devotion, and team-work can avert. The regular officer detailed to teach them must know his work and keep on his toes. No charlatan or bluffer can do the job.

The question of national prohibition of alcohol, although agitated long before the war, is closely related thereto. It has influenced the Army life and may influence it still more in the future. It cannot be wholly ignored in any history of the times. First, let us consider its adoption. In 1913, the dry forces, but not the Prohibition Party, gained a majority in Congress, and they have maintained it since. Acts restricting the sale, shipment, and advertisement of alcoholic drinks were passed before we entered the war. After our entrance a number of emergency measures designed nominally to conserve food supplies and protect the military and naval forces, but incidentally checking the manufacture and sale of alcohol, were put into effect with the general approval of the people. This approval made their enforcement so complete and satisfactory in the then existing conditions that on November 21, 1918, Congress passed the War Prohibition Act, which forbade until the completion of demobilization the sale for beverage purposes of all intoxicating drinks. This remained in effect until the Eighteenth Amendment to the Constitution became effective.

In 1917, the Senate and the House had passed a resolution submitting to the States a national prohibition amendment to the Constitution. The legislatures of three fourths of the States had approved this by January, 1919, and the ratification was proclaimed by the Secretary of State on the 29th of that month. The National Prohibition Act, known as the Volstead Act, was passed by Congress, vetoed by the President, and passed over the veto in October. Since that time it has been the most widely discussed and violated law in the statute books.

The early effects of prohibition upon the Army were all good, although it is doubtful if all the good effects attributed to the law were due to it alone. We had never before had an army of such high average quality of personnel as we had during the World War, particularly in 1917. It was the best of our manhood and in general it was enthusiastic in desire to do anything possible to promote efficiency and to win the war. It probably would have shown less drunkenness than the old professional army even if there had been no restriction on the sale of liquor. At any rate, it did show less. But two million men were sent abroad, to lands where total abstinence from alcohol and morality were not identified. They saw other peoples doing heroic things and waging a great war, and regarding wine as a friend and comforter. The views of many changed in regard to this as to many other subjects. When the Constitution was amended and the very mildest alcoholics became outlawed, the result in the Army was not greatly different from what it was outside. The Army contained wets and dries as did the general community, rigid enforcement men, personal liberty advocates, 'wet drinkers and dry voters,' men who think it a good thing for the other fellow, reformers and home-brewers. Drinking and drunkenness increased again, but not to anything like their prevalence twenty years ago.

The admissions to sick report per 1000 men for alcoholism among enlisted men in the United States for twenty years have been:

1908..... 30	1913.... 14	1918... 1.10	1923... 9.09
1909..... 25	1914.... 13	1919... 2.28	1924... 9.44
1910..... 24	1915.... 13	1920... 6.58	1925... 9.63
1911..... 18	1916.... 12	1921... 7.10	1926... 9.14
1912..... 17	1917.... 2.5	1922... 11.49	1927... 10.59

Another social development which found expression in a constitutional amendment and may eventually have a great influence upon the Army is woman suffrage. Like prohibition, this was a matter discussed for many years, but brought to realization as a product of the war. Its influence upon military policy or administration is not yet clear. The Nineteenth Amendment of the Constitution was passed by both houses of Congress in 1919 and was ratified by three fourths of the States before the presidential election of 1920. To what extent woman suffrage was responsible for the reversal of Mr. Wilson's foreign policy and for the still-birth of all plans for universal military training is not known.

Possibly as a gesture to indicate that its repudiation of the League of Nations was not due to blood-thirstiness, Congress embodied in the Naval Appropriation Bill for 1921 an authorization and request for the President to invite Great Britain and Japan to send representatives to a conference for the reduction of naval armaments. France and Italy also participated in the conference and several agreements were reached. The value of these is not a matter on which opinion is unanimous. Land armaments were not considered, but the conference was one of many evidences of the world's belief that armament and armed forces are costly evils, apparently necessary as yet, but to be discarded as soon as possible, and meanwhile to be handled with rigid economy. This is a natural *post-bellum* reaction. It has followed most of our other wars, and there is the possibility it may again become as extreme as it did in the seventies and eighties. Happily, that does not seem probable.

Another matter with potentialities of military nature is the economic history of the country since the World War, a subject too complicated and technical for discussion here, except to note

that it has left our country enormously rich, the creditor of other nations for billions of dollars, the possessor of the greatest collection of gold and the largest credit based upon gold ever known in the world, but at the same time definitely committed to a policy of tariff protection calculated to prevent importation of foreign goods and so to prevent foreign payments of debts in the way of trade, as such debts have usually been paid. Our prosperity we naturally attribute to our foresight, wisdom, and virtue. We shine, in our own eyes, like a good deed in a naughty world; in the eyes of many others, like a golden target. The size of our army is based upon our appearance as we see ourselves.

Many other problems, international and domestic, social, economic, racial, and hygienic, confront us. It is hoped that they may all be solved without the use of arms. Perhaps in their solution the Medical Department may find additional fields of usefulness. Possibly opportunities greater than those of Reed, Gorgas, and Wood await the young men in the Department now; possibly greater men than these are in it. Certainly the young men of the Medical, Dental, and Veterinary Corps are intelligent, educated, sound, hard-working, devoted, and well trained. They can be counted upon for good work.

Among the hygienic problems of great military importance, lying directly at hand, and crying for solution at least six months out of every year, is the control of respiratory diseases. We make no more headway against them than we made against yellow fever prior to 1900. Possibly some discovery as simple as that of the mosquito's rôle in yellow fever will put us in the way of controlling them. Possibly they lie just as far outside the routine bacteriology and hygiene of to-day as the mosquito-borne diseases lay outside those of 1895. The application of the proper key may unlock the whole subject. May the Medical Department find that key, and find it soon!

CHAPTER XVII

MEDICAL DEPARTMENT WORK

GENERAL GORGAS was succeeded as Surgeon General on October 4, 1918, by Merritte W. Ireland, who was at the time Chief Surgeon of the A.E.F. As it is not wise or expedient that his subordinate try to evaluate his personality and his work, that is left to General Pershing, who knows him well and has kindly consented to do the work. The present writer will merely discuss the Medical Department and mention General Ireland as its head when it is necessary to do so. He was succeeded as Chief Surgeon, A.E.F., by Brigadier General Walter D. McCaw.

In less than six weeks after he became Surgeon General, the war ended and he was confronted by the tremendous tasks of demobilization and reorganization. The armies contained 3,500,000 men, the Medical Department more than 350,000 persons, and the sick and wounded in hospitals numbered about 265,000. Ninety-eight per cent or more of all these were to be returned to civil life in as good health as possible, to undergo physical examination and to have recorded their physical condition, particularly their disabilities. This work fell upon the Medical Department, and as its own force was reduced along with the others of the Army, the work did not relax or grow easier until the job was completed.

Of course the largest part of this work came in 1919. The wheels of the great machine had to be reversed. In addition to conducting physical examinations of officers and men prior to discharge from service and the return to civil life of the officers and enlisted men of the Medical Department, the treatment of sick and wounded and the reconstruction and vocational training of the permanently disabled were very great tasks. At the time of the armistice there were 76,964 patients in general and base hos-

pitals in America; by the first of July, 1919, the number had fallen to 40,796. Of these, some 30,000 were overseas cases. During the second six months of the year, 12,000 more cases were received from overseas and a large number from home stations, but by the end of that time there were but 5083 cases remaining in general hospitals.

In July, 1919, there were thirty-one general hospitals, the large hospitals at ports of embarkation and the base hospitals at all camps. One year later there remained but nine general hospitals. The discharged sick and wounded who were still in need of treatment passed to the care of the United States Public Health Service, and many of the Army's hospitals were turned over to that service. Leased buildings were returned to their owners, and most general and base hospitals which were not turned over to the Public Health Service were either discontinued or converted into camp hospitals and placed under department commanders. During and immediately after the war it was the policy to retain disabled soldiers under treatment in Army hospitals until the maximum restoration of health and strength had been attained.

In June, 1918, Congress had charged the Bureau of War Risk Insurance with the establishment of a Board of Vocational Education and the preparation of courses of instruction for its use. Soldiers taking the courses were to receive compensation and the families of enlisted men taking them were to receive family allowances. Many of those courses were to be given at Army hospitals. As a result the larger hospitals became also schools, wherein were taught a great variety of subjects: jewelry trades, automobile repair, typewriting, agriculture, foreign languages, and others. Men able to attend other schools were sent to college, to technical and professional schools. The day before the armistice was signed, it was ordered that disabled men, other than officers of the Regular Army and special surgical cases, who had been in hospital for six months could be given discharges if they applied for them in writing, and that all who had been in hospital for one year, unless too sick to be moved or unless they certified that

they could not provide themselves with necessary care and attention, should be discharged.¹

The Sweet Bill (approved December 24, 1919) provided for many discharged disabled soldiers an increased compensation which considerably exceeded the pay of enlisted men. In consequence they all applied for discharge, and got it. As the pay of officers, except second lieutenants, exceeded such allowances, few of them took discharges.

In August, 1921, a new organization, the Veterans' Bureau, was created by law and charged with that care of the disabled which had previously been furnished by the Public Health Service and the Board for Vocational Education. In this organization, formed almost three years after the armistice, occurred the first scandalous dishonesty connected with our great war effort, and it did not involve the Army or the medical profession. Army hospitals have cared for many beneficiaries of the Veterans' Bureau from the time of its establishment up to the present, being paid therefor by the Bureau.

Meanwhile, the Medical Department's personnel was reduced rapidly. 'The total number of officers of the Medical Department, including those of the Sanitary Corps and the Ambulance Service, who were discharged during the year (fiscal year 1920) amounted to 15,908. The net loss in the enlisted force amounted to 83,577. On July 1, 1919, there were 12,731 officers, including the Reserve Corps, in active service in the Medical Corps. One year later there were 1948. The Dental Corps fell from 2219 to 322: the Veterinary Corps from 1024 officers to 283. In the Nurse Corps at the beginning of the year there were 9616 nurses, and at the end of the year 1551.'²

The Surgeon General also stated that it had become increasingly difficult to obtain satisfactory candidates for the Medical, Dental, and Veterinary Corps, and that the number of vacancies

¹ After discharge they passed to the care of the Bureau of War Risk Insurance, the medical work of which was entrusted to the Public Health Service.

² *Surgeon General's Report* (1920), 19.

in the Medical Corps on July 1, 1920, numbered 1041. However, most of these were subsequently filled by officers who had been in the World War and decided that they liked the service.

There were three great classes of men who remained in Army hospitals for very long periods and required much care and attention. These were the tuberculous, the cases of empyema following pneumonia and influenza, and the seriously disabled and mutilated war wounded. For all of these, as well as for mental and nervous cases, special hospitals were designated. Later, as the Army was reduced, the tuberculous cases remaining were concentrated at Fitzsimons General Hospital, the nervous and mental cases transferred to the care of the Public Health Service or the Veterans' Bureau, and the empyema cases and worst, or most persistently disabling, war wounds concentrated, many of them as beneficiaries of the Veterans' Bureau, in Walter Reed Hospital, where Colonel William L. Keller, Medical Corps, by his skillful and patient surgery, achieved results in their treatment which have received the admiration of the surgical profession.

On June 30, 1920, there were in Army hospitals in the United States 5768 military patients whose disabilities resulted from battle wounds.

The office of the Chief Surgeon, A.E.F., was discontinued in the latter part of 1919. Up to September 1st it continued to be the office of the Chief Surgeon of all American forces in Europe. After that date it had to do only with personnel remaining in France, the Medical Department of the American Forces in Germany being under the commanding general of those forces. Colonel (now Brigadier General) F. R. Keefer was Chief Surgeon in Germany. In December, the Chief Surgeon's Office, A.E.F., organized a Polish Typhus Relief Expedition, the personnel drawn from the Medical Department of the Regular Army, but this expedition was later transferred to the American Forces in Germany.

Reorganization of the Medical Department also had to be undertaken, along with the general reorganization of the Army.

Something has been said of this in the preceding chapter, and it is only necessary to add that every effort was made to effect the Medical Department reorganization in the light of the lessons of the World War, to modernize it, to make it capable of quick and large expansion, to make provision for the best education, best equipment, and most thorough training of the medical, dental, and veterinary personnel of the Regular Army, the National Guard, and the organized Reserves. Much, very much, has been accomplished, but the work is still incomplete and progressing. General Ireland appreciated the General Staff from the time of its establishment and worked in complete harmony with it at home and abroad. In consequence, he had its confidence when demobilization and reorganization came. To an equal degree it had his confidence. Similarly, he has been trusted by the Military Committees of Senate and House, and, while they have not always seen their way to granting all of his requests, they have granted many, and they have accorded him a degree of consideration which many Surgeon Generals have needed sorely. To these facts we are indebted for much of the progress the Department has made since the war.

The General Staff has given its approval to Medical Department Tables of Organization which cover the detailed requirements of all types of units to be used by the Department in peace and war. Existing war plans describe how, when, and where these units are to be organized, equipped, and trained, whether they be of the Regular Army, of the National Guard, or the Reserve. The lessons of the World War, the insufficiency of Medical Department personnel and matériel in the A.E.F., the sometimes narrow escapes from disaster have not been forgotten, and these new tables provide for the avoidance of similar difficulties in the future. Great attention has been given to the increase of enrollment in the Reserve Corps sections of the Medical Department, and these are all in very healthy condition and evincing great interest in their military work. A suitable reserve store of war-time equipment and supplies is being accumulated. New and

improved equipment for persons and hospitals has been devised, tested, approved, adopted, and, in some instances, manufactured. In other instances, where stocks on hand are such as not yet to permit of their increase, plans and models of the new equipment have received approval which will permit their prompt manufacture when circumstances permit or necessitate it. Nomenclature has been brought into conformity with general usage in the Army; for example, the change of the name of the old 'sanitary train' to 'medical regiment,' or with civilian usage, as the change of 'the attending surgeon's office' to 'dispensary.'

Like the rest of the Army, the Medical Department has revised all regulations, manuals, and similar guides and published them in the form of loose-leaf regulations. This has been done excellently and the new regulations constitute guide-books for the man new to the service.

Training facilities have been largely and wisely improved. The Army Medical School, which Sternberg was able to start in a few rooms of the Army Medical Museum with instructors who taught in addition to their other duties, has its own handsome building in the Army Medical Center, its own full-time faculty and a splendid equipment. In addition, there are the Army Dental School, the Army Veterinary School, and the Army School of Nursing at the same place. All of these are doing admirable work in the training of personnel and in independent research. The Medical Field Service School at Carlisle Barracks is unique, and receives the admiration of visiting medical officers from foreign armies. No subjects of the medical curriculum are taught in it, but officers and enlisted men there receive training in medico-military matters, administration, tactics, field sanitation, work with field units, map-making, equitation, motor mechanics, and kindred subjects. It is a place of enthusiastic and interested work. Its graduates are eligible for admission to the Leavenworth School and some are sent there each year. Likewise, each year, some of those who have gone through Leavenworth are sent to the War College. Connected with and a part of the Medical Field

Service School is the Medical Department Equipment Laboratory, wherein are designed, tested, and perfected the numerous improvements in equipment of which mention has been made.

This school also publishes the Army Medical Bulletins, which include monographs of very great value to the Medical Department. Every officer of the Department should preserve a complete file of these. From this school Major A. D. Tuttle put forth his excellent 'Handbook for the Medical Soldier.'¹

The Air Service Medical Research Board of war-time has become the School of Aviation Medicine, which gives excellent instruction and training for the special preparation of officers assigned to duty with the Air Corps, in addition to carrying on research work.

The Chemical Warfare Service also has special duties for medical officers, but no school for them, and provides special training and research facilities for them in its school at Edgewood Arsenal.

The Army School of Nursing was begun in October, 1921, and has operated since, giving excellent training to the young women of the fine type which it is able to secure. The school's course is considered very thorough and its diploma one of the most prized.

The training activities of the Medical Department are not limited to attendance on the regular courses of the schools mentioned. Excellent correspondence courses have been arranged, and many officers of the Regular Army, National Guard, and Reserves are studying and doing good work by means of these. Regular officers are at times detailed to civilian institutions for special instruction, and many senior officers of the Department are given special courses of advanced work at the Medical Field Service School as they approach promotion to the higher grades.

The work of instructing line officers in matters of health, sanitation, and general hygiene and medico-military matters has been extended, and there are medical officers instructing in the various special service schools as well as at the Military Academy, the Command and General Staff School, and the War College. This

¹ William Wood & Co., New York, 1927.

has been of very great value, not only in the direct sense of improving the health of the Army through the line officer's own activities, but in the less direct way of making him a helper, instead of a hindrance, to the work of the medical officer.

The annual physical examination of officers, originally instituted to determine if they were physically fit to keep off of the retired list, has become a thorough survey of physical condition and health, including examination of all special organs, and, if there be any indication for it, study in hospital, with X-ray examinations, functional tests of organ capacity, metabolism rates, and blood chemistry.

The development of the Army Medical Center about Walter Reed General Hospital has been one of the most notable advances made by the Medical Department since the World War. The original hospital grounds have been greatly enlarged; the temporary wards which cared for the hospital's war-time expansion have been partly removed; two large and handsome additions have been made to the main building of the hospital; a handsome and very suitably arranged building houses the Army Medical, Dental, and Veterinary Schools; a fine brick Red Cross building, architecturally in keeping with the hospital, provides an auditorium and amusement places; the gardens have been made very beautiful; nurses' quarters and improvements in the third floor of the main building and the construction of new wards are authorized to begin this year and other improvements are contemplated.

Two large general hospitals, Fitzsimons at Denver for tuberculous cases, and Beaumont at El Paso, have been built and put into operation since General Ireland became Surgeon General.

In the first two months of 1920 there was a recurrence of influenza in epidemic form, but fortunately attacking a much smaller percentage of soldiers and showing lower rates of pneumonic complications and deaths than during the war. Nevertheless, it materially increased the death rate.

Three important departmental developments of 1920 were the

simplification of paper work, the return to the Department of control of its own supplies, and the new method of getting new officers for the Medical Corps. This last is by accepting as internes in our largest and best hospitals especially recommended new graduates of Class A medical schools, giving them a year of internship and then giving them commissions if their conduct and work recommend them and they desire to remain in the service.

The shortage of medical officers brought about by the discharges of 1922 led the Surgeon General that year to ask the corps area commanders for statements of the needs of their respective areas. 'A summary of these reports shows a requirement of 1316 medical, 241 dental, 187 veterinary, 107 administrative officers, 882 nurses, and 8900 enlisted men to meet the existing needs.' These requirements exceeded the strength of the Department by 333 medical, 113 dental, 61 veterinary, and 35 administrative officers, 213 nurses, and 1700 enlisted men. Since that time the Surgeon General has consistently sought to have the requirements met, thus far unsuccessfully.

As the war-grouchiness lessened, the Reserve Corps took on a new growth, and in 1924 the Surgeon General was able to report that the Reserves of the Medical Department numbered: Medical Corps, 7559; Dental Corps, 3055; Veterinary Corps, 865; Sanitary Corps, 416; Medical Administrative Corps, 880; while the enrollment of Red Cross nurses, constituting the Reserve of the Army Nurse Corps, was 40,636. These numbers have grown steadily since, and at the present time (1928) they are: Medical Corps, 12,113; Dental Corps, 4706; Veterinary Corps, 1061; Sanitary Corps, 497; Medical Administrative Corps, 1889; Nurse Corps, 47,252.

The organization of non-divisional reserve units of the Medical Department has also gone forward and at the present time (1928) there are organized or being organized:

Convalescent Hospitals.....	7
Evacuation Hospitals.....	88

General Dispensaries.....	7
General Hospitals.....	147
Hospital Centers.....	23
Hospital Trains.....	60
Army Medical Laboratories.....	5
Medical Laboratories, aviation.....	16
Medical Laboratories, Communication Zone.....	2
Auxiliary surgical groups.....	2
Station Hospitals.....	134
Army Medical Supply Depots.....	6
Army Medical Supply Depots, Communication Zone.....	13
Surgical Hospitals.....	68
Veterinary Convalescent Hospitals.....	5
Veterinary Evacuation Hospitals.....	15
Veterinary General Hospitals.....	45
Veterinary Station Hospitals.....	12

Procurement planning in connection with industrial preparedness has been carried on as a part of the War Department's general plan of industrial preparedness. Eight officers of the Regular Army Medical Department have full-time assignments to the duty, reserve officers who are intimately associated with producers of Medical Department supplies have been given tours of duty in the Surgeon General's Office, several regular officers have taken the best of business courses, and in many ways preparedness is being promoted wisely.

So great have been the growth of medicine and the demands upon the Medical Department for the very best of professional care, that the encouragement of specialization became a necessity. This has been done so well that every line of the Medical Department's work has its specialists who rank with the best men in similar lines in civilian life. The supply is kept up by the detail of younger men as understudies to our leading specialists and as students in post-graduate courses of leading schools.

One is almost tempted to violate a promise and to express an opinion that all is well in the Medical Department except for the matter of insufficient personnel, but the recollection of similar statements made before the Spanish-American War acts as a

restraint. Instead, the hope is expressed that the Department will meet all future calls upon it in a satisfactory manner.

What about it as a department, how is it meeting its obligations now, and how does it fit into the military machine? It is believed that the answer to the first question is that it is meeting all obligations in a satisfactory manner, that it is fulfilling excellently all peace-time requirements, and making such advance preparations and giving such training as will insure efficiency in the next war. As for its fitting into the military machine, it recognizes fully the importance of the interest, aid, and support of the General Staff, its subordination to and dependence for success upon that body; and the General Staff in turn understands the importance of the Medical Department and shows an interest in and a support of its work such as the Department has rarely enjoyed before.

These things augur well for the future.

What of the future? Prophecy is no part of the task to which the writer was detailed, but in case young men choosing careers should wish to know what the Medical Department offers them, a general statement will be made on the basis of past and present experience. Briefly, it offers a pleasant, interesting, varied life, a modest competence on which to live decently and to rear and educate a family, if the life be simple, the family sensible, and the education reasonable. It offers association with pleasant and high-minded (but not usually 'high-brow') people, opportunities to see many men and many lands, and to learn that the Colonel's lady and Judy O'Grady are sisters under their skin. It offers good quarters and bad, bad climates and good, with exceptional weather during one's stay in each. It affords the greatest of blessings, interesting work and necessity for growth. The officers of the Department are furnished books and journals in abundance; hospitals, instruments, and other facilities for doing good work. They have opportunity for useful work, and useful parts in great projects. Army life, like any other, yields happiness and satisfaction largely corresponding to the happiness and satisfaction put into it. Certain things the Medical Department officer cannot

do. He can neither grow rich nor provide decently for his family, in case of his death, from savings made from his pay. He should therefore carry good life insurance, live simply within his pay, save systematically, strive to acquire sound business sense and to invest wisely what he can save. This is simple common sense, but it is one of the drawbacks of an assured living wage, combined with interesting work, that they tend to make men forget it, with the result that many Army widows and orphans are provided for but poorly, some miserably. The Army medical man can do one great and satisfying thing; he can practice his profession without exacting money from the unfortunate, at all times keeping his self-respect, and if he ever finds it necessary to lie, it is only the blessed white lie that allays fear and suffering, never the degrading black one prompted by love of money or of place.

There remains great work to be done. First of all is that great problem of the prevention or control of respiratory diseases, unquestionably the greatest confronting military medicine. It would also be greatly for the good of the service and of mankind if you could prevent men wearing out so soon, could so prolong life and usefulness that the age of sixty-four would not necessarily mean retirement and the strength of the days of fourscore years no longer be labor and sorrow.

You may be able to help explain and remedy the melancholy fact to which the Surgeon General called attention in 1924 and which has remained fact since, namely, that the leading single cause of death in the United States Army is suicide. This should not be. Whether the fault and the remedy lie with the line or the Medical Department, it should not be, for the Army is a pleasant life to most of us, an interesting, busy, useful life. It should be such for all.

Read Stevenson's dedication to 'Underwoods,' and if you then wish to be both soldier and physician, come in.

CHAPTER XVIII

EXTRA-DEPARTMENTAL AND EXTRA-MEDICAL ACTIVITIES OF MEDICAL OFFICERS

PRIOR to the Spanish-American War all of the piping times of peace, the intervals between national wars, were days of small things for the Army, days of neglect and forgetfulness by the Government. In such circumstances, the more intelligent, energetic, and curious took to themselves hobbies, and spent much time and labor upon them. Most commonly the hobby was reading or languages, but these usually resulted in nothing which has come down to us. Some men took up other studies and left works and names which have been transmitted. Surgeon General Lovell, as has been stated, instituted in 1819 the recording of weather observations by medical officers at all posts. The first observations were of temperature only. Later were added measurement of rainfall, and in 1843 wind direction and notes as to sunshine, cloudiness, rain, or snow. In 1844, Surgeon General Lawson had these 'diaries' abstracted and tables of mean temperatures prepared. James P. Espy (Meteorologist of the War Department, who probably worked in the Surgeon General's Office) in 1841 had published his 'Philosophy of Storms' and was then elaborating his theories. He had devised a series of skeleton maps on which he could show by appropriate symbols the direction and force of winds and barometric fluctuations at the points of observation. 'By an examination of these maps we are enabled to learn the shape and size of storms, and the direction and velocity of their motion, as they pass over the United States.' Here was the forerunner of the Weather Bureau maps of to-day. Officers were then directed to record barometric observations, clearness of the sky, and force of wind on decimal scales, direction and velocity of clouds, wet bulb readings, and other noteworthy phenomena.

By 1860, these observations filled sixty-four large folio volumes in the Surgeon General's Office. In 1870, the work was taken over by the Signal Corps, but the observations continued a part of the post surgeon's duties in many posts for some years after the Spanish-American War — at West Point, New York, until 1927. In 1890, the Weather Bureau became a part of the Department of Agriculture.

The Signal Corps originated in the hobby of a medical officer. Assistant Surgeon Albert J. Myer, the man for whom Fort Myer is named, entered the Army in 1854. He became interested in mechanical and manual signaling and later in telegraphic communications in armies. He organized signaling in the Army, and on June 27, 1860, he was commissioned Major and Signal Officer, the only one in the Army.

He won credit, brevet, and successive promotion to the grades of lieutenant colonel, colonel, and brigadier general as head of the Signal Corps in the Civil War. He was made Colonel and Chief Signal Officer in 1866, and Brigadier General and Chief Signal Officer in 1880.

Of all the members of the Medical Department who have done notable work of scientific importance outside of purely medical lines, few stand higher than Colonel John S. Billings. His greatest work for the Medical Department was the building-up of the Library of the Surgeon General's Office, now the Army Medical Library. From the small beginning previously mentioned, he made it the greatest medical library in America, possibly the greatest in the world. It is internationally known. Its Index Catalogue has grown from twenty-four duodecimo pages to forty-four double-columned, quarto volumes, recognized as perhaps the greatest medical bibliographic work ever accomplished. The Library now (1928) contains about 320,000 bound volumes, 550,000 other printed items, including unbound volumes, pamphlets, monographs, and transactions, over 7000 photographs of physicians and scientists, 450 medical caricatures, 520 medical incunabula, and many ancient manuscripts. It is in effect a

national medical library and it serves writers and investigators in all parts of the country.

In 1869-70, Billings was detailed to the Treasury Department for the purpose of inspecting and improving the Marine Hospital Service, the predecessor of the now great and invaluable Public Health Service. It was then a poor thing. Billings recommended a plan of reorganization which was followed and which marked the beginning of the growth which has since occurred. Billings served as a consultant to the service until 1874.

According to the London 'Times' (July 22, 1915): 'Before 1880, when Dr. Billings took charge of the vital statistics of the United States Census, they were worse than useless. For three decades — the Tenth, Eleventh, and Twelfth Censuses — Dr. Billings was a volunteer worker in this field of statistical inquiry, and from a state of chaos he brought the vital statistics of the United States to their present satisfactory condition.'

In 1875, he began to plan the Johns Hopkins Hospital. His plans included not only buildings, but also organization and administration; particularly including the teaching of medicine and surgery. As he himself said, he planned to equal or excel any similar institution in the world. The hospital was opened in 1889, and it fulfilled his plans and has since stood at the very front of medical education and investigation. Billings was also instrumental in gathering the group of men who were its first chiefs and whose happy fellowship made their great work the institution's crowning glory.

When Billings retired from the Army in 1895, he at first went to the University of Pennsylvania, but in 1896 he was chosen to organize the New York City Public Library, then consisting of three separate institutions. After a trip to Europe, he began the work of classification and cataloguing. A splendid new building was erected according to his sketch plans and in 1911 the library was opened. Dr. Billings had arranged the 600,000 volumes and pamphlets and planned for the operation of the main building and for branch libraries made possible by Andrew Carnegie's gifts.

Three great works, the Army Medical Library, Johns Hopkins Hospital, and the New York City Library, are monuments to the industry and ability of a great man. Why was he not made Surgeon General? Probably because he was for thirty years side-tracked in a library and doing work which did not relate to the Army as a whole. The work he did was enormously greater than that of any Surgeon General during any period in which he might have been appointed. Let us give thanks.

We may also be thankful that Lieutenant Colonel Fielding H. Garrison, Medical Corps, Billings's protégé, has for a period longer than Billings's also been immured in the Library, there to dig out by immense labor and to absorb by immense capacity the great learning necessary in the preparation of his 'Introduction to the History of Medicine,' the fourth edition of which is just off the press, a work of which American medicine, letters, and scholarship are alike proud.

No member of the Medical Department has enjoyed so great contemporary fame as Leonard Wood. Some of his Army work has been mentioned, but his greater fame rests on his record as administrator and governor general in Cuba and the Philippines and as Chief of Staff of the Army. This brought him within sight, almost within reach, of the Presidency in 1920. That he did not reach that goal is a source of regret to many.

Mention has also been made of that assistant surgeon, F. C. Ainsworth, who revolutionized the work of the Record and Pension Division of the Surgeon General's Office, became Chief of the Record and Pension Bureau with the rank of brigadier general, later became Military Secretary and then the Adjutant General with the rank of major general. He put the index card into business. Going to the Record and Pension Division in 1886 when the arrears of cases numbered 9511 and the delay in each case was two and a half or three months, he had by the following March reduced the number of cases in arrears to 353, and by June, 1887, the average time required for a case was one day. The Adjutant General's Office could not supply military records as rapidly as

Ainsworth could supply the medical, so the Record and Pension Bureau was formed, with Ainsworth at its head. It was soon supplying both promptly. When he became Military Secretary, the Bureau went with him, and it is still a part of the Adjutant General's Office.

Ainsworth there showed the same ability and capacity as in his earlier work and was considered one of the very ablest officers in the Army when he retired at his own request in 1912.

General Ainsworth was requested to contribute personal reminiscences of Surgeon Generals whom he has known. He declined on the ground that some of his opinions would not be printable. But he wrote: 'In my judgment the Department was never more efficient and more highly esteemed in Congress, the Army, and the country at large than it is now. And in the long line of Surgeon Generals whom I have known well in the past fifty years, the ablest one who has ever occupied that position is, in my estimation, the present Surgeon General, Merritte W. Ireland.'

It is not surprising that natural history should have been attractive to medical men who found in isolated, frontier stations too little work to keep them busy. In consequence many of them were accomplished zoölogists, botanists, or paleontologists, a fact clearly shown by their accounts of their various posts, as published in the 'Hygiene of the United States Army,' which Billings compiled.

The great majority of them did not write for publication, but some put forth notable work. Most prominent of these was Assistant Surgeon Elliott Coues, who was in the service from 1864 to 1881. He published a 'Key to North American Birds' in 1872, 'Birds of the Colorado River' in 1881, and several other important contributions at other times. In 1881, he resigned to become Secretary of the United States Geological and Geographic Survey. With Acting Assistant Surgeon H. C. Yarrow and others he contributed to a large volume, 'Zoölogy of the United States West of the One Hundredth Meridian,' published by the Geological Survey in 1875.

Major James C. Merrill, who was Librarian of the Surgeon General's Office after Billings, revised the Library classification of natural history subjects, wrote on the 'Ornithology of Southern Texas' (1878), and similar subjects.

Major Edgar A. Mearns wrote on 'Mammals of the Mexican Border' in 1907, and over a period of many years made notable contributions to ornithology and mammalogy, worked in the Smithsonian Institution, and was widely known for his scientific attainments. When, after his retirement from the Presidency, Mr. Roosevelt made his trip to Africa to collect specimens for the National Museum of Natural History, Mearns accompanied him as scientific member of the expedition.

Major Robert W. Shufeldt wrote on many subjects, in books and periodicals. Some of these articles were collected in book form, one 'Studies of the Human Form,' 1908, one on 'Parasitic Enemies of Trees and Plants,' 1922.

With the great developments which have come in medicine and medico-military matters, officers have of late years had little time to devote to hobbies outside their profession. They could only find it by neglecting pressing duties, so it is improbable that many will in the future become authorities on subjects not related to the Department.

L'ENVOI

'Tis a pity that all the fine men of the Medical Department who have done good or interesting things have not been mentioned herein, but it was impossible if the book were to be kept within reasonable bounds. Such men have been numerous. Will not those of them who yet survive, but are old, join hands with the writer and pass cheerfully into the oblivion which has swallowed our ancestors through the tens of thousands of years which have passed since men became persons rather than beasts? That oblivion so hides those back of a very few generations that their names, stations, and individual works are forever lost to fame, yet their lives and their now unknown thoughts and deeds have been the material from which all human society has been wrought. By them was language created from grunts, the family made a unit, the beasts and the elements mastered. By them was gained laboriously the knowledge which each child now has as a birth-right, by them were created religions and gods, by them grew science. From savage tribes they formed great nations, from ignorance and fear they advanced to education and freedom. Yet they are forgotten. They are no more than the coral animalcule whose small skeleton a million years ago contributed its infinitesimal bit to the foundation of a great island. But to-day that island *is*. So we, our small parts played, pass unknown, but our creation lives and is greater than we. Partly because of us the medicine of the future will be what it will be, the America of the future will be what it will be, the people of the future, sprung from our loins, will be what they will be, civilization, life, and thought will be what they will be. The gods of the cave man are not the God that is worshiped to-day, and perhaps partly because of us, even God will be what HE will be.

It is enough. We have lived. What does it matter whether our names have been printed in ink on paper?

Hail and farewell.

SURGEON GENERAL MERRITTE W. IRELAND

By JOHN J. PERSHING, GENERAL OF THE ARMIES

MAJOR GENERAL MERRITTE W. IRELAND, the present Surgeon General, was born at Columbia City, Indiana, on May 31, 1867.

He entered the Medical Corps in May, 1891, and was assigned to duty at Jefferson Barracks. In October of the same year he was sent to Fort Riley, where, as assistant to Major John van Rensselaer Hoff, he had charge of the first company of instruction of the Hospital Corps that was ever organized. Here began a friendship which lasted until Colonel Hoff's death. In 1893 Dr. Ireland married Miss Elizabeth Liggett, the sweetheart of his boyhood. He served at Fort Yates, Fort Apache, Fort Logan, Fort Stanton, Benicia Barracks, and the Presidio of San Francisco until the Spanish-American War, when he accompanied field artillery to Port Tampa. There he was assigned to a field hospital, with which he served in General Shafter's expedition to Cuba, winning high commendation from his superiors.

With the rest of Shafter's army, he returned to Montauk Point, where he became executive officer to the Chief Surgeon, going from there to Fort Wayne, Michigan, as Post Surgeon. In August of 1899, he was assigned as Surgeon of the 45th Volunteer Infantry, which he accompanied to the Philippines, engaging in active service with the regiment, especially in Cavite Province, until April, 1900, when he was appointed Medical Supply Officer for the Philippines, in which service he was again commended.

He was selected as one of the three assistants to Robert M. O'Reilly, who became Surgeon General in 1902, the other two being Walter D. McCaw and Jefferson R. Kean. One or more of these officers have continued as advisers to the Surgeon General up to the present time, except when General Gorgas was Surgeon General, and they have been very influential in building up the Medical Department under the policies inaugurated by General

O'Reilly in accordance with the recommendations of the Dodge Commission.

General Ireland's experience as assistant in the office of the Surgeon General from 1902 to 1912 gave him a remarkable knowledge of his corps, its needs, and its true relation to the other staff corps, the General Staff and the army, and taught him the necessity of coöperation, which he has since practised with outstanding success. During that period and after he has frequently appeared before committees of Congress, among whom he has established a reputation for accuracy, clearness and frankness that gives much weight to his recommendations.

His second tour in the Philippines, from 1912 to 1915, was spent at the brigade post of Fort McKinley, where he greatly improved the Medical Service. On his return he was made Post Surgeon at Fort Sam Houston, Texas, and through his efforts the hospital there was enlarged and improved and became the most important general hospital for the troops concentrated on the border in 1916.

When I was appointed to command the A.E.F., it was my desire to have Ireland as Chief Surgeon, and, although he accompanied me to France, the Surgeon General urged the appointment of a senior officer, Colonel A. E. Bradley, who was then in France. Ireland cheerfully accepted the position of assistant, in which capacity he bore the burden of the office administration until the failure of Bradley's health in April, 1918, when Ireland became my Chief Surgeon. Here all of his administrative and professional ability was called into play as the head of the greatly expanded Medical Department, which had grown from nothing to a force of 16,000 officers, 10,000 nurses, and 135,000 enlisted men by November 15, 1918, at one time caring for as many as 192,000 sick and wounded. The work of the Medical Corps was splendidly done, and Ireland, as its leader, showed himself a great man. He was especially happy in his appreciation of the ability and services of medical men from civil life.

In the summer of 1918 a group of his seniors and contemporaries in the Medical Corps, each of whom might with good reason have

been a candidate himself, requested me to recommend General Ireland for the position of Surgeon General, from which General Gorgas was about to retire. It was a rare tribute to be thus regarded by the members of his own corps. I had already decided to recommend him, and he has since been twice reappointed solely upon his record of efficiency.

He is abounding in vitality, mental and physical, quick and accurate in decision, and prompt in action once the decision is made. He understands men and knows how to work with them for the common end. He has a thorough knowledge of the organization of the army and the Medical Department's place in it. He is far-sighted in making plans, and unusually able in administration. He is loyal always, but courageous in promoting sound views and avoiding error. He has an attractive personality and a diplomatic turn of mind, through which he has been able, among other things, to promote in the War Department and in Congress the goal of his ambition, which is to make his department more useful not only to the army but to the profession in general.

APPENDIX

APPENDIX I

THE COMMONWEALTH OF MASSACHUSETTS
OFFICE OF THE MEDICAL EXAMINER
SUFFOLK COUNTY, SOUTHERN DISTRICT
818 HARRISON AVENUE

May 5, 1928

*Colonel Percy M. Ashburn
Surgeon General's Library
Washington, D.C.*

DEAR SIR:

For ten years I have been engaged at intervals in a research into the life records of Benjamin Church, Director of the Hospital of the American Army. I have three manuscript note books of his together with other autographic material, and photostats of everything in his handwriting in the collections of the Library of Congress, American Antiquarian Society and various libraries in Boston, New York, and Philadelphia. As far as I can learn this represents all of the original Church material which is known apart from his published works, copies of which I own. I have read all of the available printed records dealing with him.

My study of the man leads me to believe that he was not a traitor in the accepted sense of the word. He was convicted not of treason but of communicating with the enemy. Of this he was guilty. He wrote in cipher a letter to his friend Major Cain of the British service in Boston. This letter was written at a time when the American Army at Cambridge had but three rounds of ammunition per man. If General Gage had had that knowledge he could have wiped out the American Army overnight. Church's letter, written on his return from a trip to Philadelphia as the representative of the Provincial Congress to the Continental Congress, states that the colonials had many powder mills and that he had seen

100 cannon at Providence. Its tenor was to convey to the British that the colonials had tremendous resources and that the rebellion was a serious matter. It should be remembered that at this time no one spoke of independence save James Otis or Samuel Adams. The American group were fighting as British citizens for British rights, as voiced in Warren's Boston Massacre oration of March 5, 1775. I am satisfied that Church hoped to so influence the British in Boston that their reports to the King would bring about an adjudication of the quarrel between the colonists and the Parliament.

It was an age of suspicion. Any man who dared to suggest that there was more than one side to the question was subjected by the Colonists to the most bitter treatment. The reconstruction period following the Civil War was marked by very mild abuses when compared with the outrages inflicted upon the so-called loyalists during the period preceding the Revolutionary War. So marked was the animosity to any person suspected of sympathy with the British cause that Church's friends, powerful as they were, didn't dare to defend him. Even after he was freed and returned to Boston this animosity led to attempts upon his life, and he was therefore forced to seek an asylum in the West Indies. The vessel conveying him was never heard from again.

Benjamin Church was a great man. Scholar, poet, orator, statesman, one of the few American physicians who had studied abroad, secretary of the committee of correspondence and its most powerful member, the peer and intimate of Hancock, Adams and Warren, he was among the most important personages in establishing the foundations of American liberty in the Province of the Massachusetts Bay. His English experience made him the friend and associate of the British officers who were sent to America in the years preceding the revolution. His eminence in the pre-revolutionary activities of the colonies, his friendship with British officers, and notably with Major Cain, and his conceit, were responsible, in my opinion, for the misstep which led to his downfall. He visualised himself as the arbitrator who should bring

about the restoration of friendly relations between the fatherland and the colonies, little suspecting that his efforts would place him in the ranks of those who are branded as traitors.

Yours very truly

TIMOTHY LEARY

APPENDIX 2

REMARKS OF DR. JAMES TILTON REGARDING THE TREATMENT OF 'THE JAIL FEVER'¹

ALTHOUGH often compelled to let blood in the commencement of this fever, we were cautious of repeating this operation; and were disposed to avoid it altogether, when not demanded by a full pulse and other pressing circumstances. After bleeding, if that operation should be thought necessary, a vomit was deemed of excellent use, by opening and squeezing all the glands of the body, and thus shaking from the nervous system, the contaminating poison, before its impressions are fixed. With this view the earlier the vomit is administered the better. During the prelude or those marks of approaching danger above described, a vomit may prevent the fever altogether.

When the fever is formed, mercury is of the greatest importance, so long as any signs of an inflammatory diathesis remain. This Sampsonian remedy has the power of subduing all manner of contagion or infection that we are yet acquainted with. Thus, besides syphilis, itch etc. without fever, it is regarded as specific in small pox, measles, scarlatina, influenza, yellow fever, etc., and is found to be not less successful in the early stages of Jail fever. The manner in which this remedy sets all the secretions afloat, may serve in some measure to explain its beneficial effects. Hence it is that in yellow fever, remitting or any other fever, if we can only touch the patient's mouth with mercury, we regard him as safe.

In the American hospitals, we were accustomed to give Calomel,

¹ This 'jail fever' was the typhus of that day, which in turn was much of it typhoid. What Tilton discussed was probably mostly typhoid fever, as he says: 'If I ever saw the petechiae, so much dwelt upon by Pringle and Monro, I have forgotten all about them.' This indicates that he was not familiar with exanthematic typhus.

in various forms, according to circumstances: sometimes alone, or mixed with opium, tartar emetic, neutral salts etc. . . . Blisters were used in the low and depressed state of jail fever, with manifest advantage.

APPENDIX 3

BEAUMONT'S ACCOUNT OF THE CASE OF ALEXIS ST. MARTIN

ALEX SAMATA, ST. MARTIN, SAN MATEN, a Canadian lad about 19 years old, hardy, robust and healthy, was accidentally shot by the unlucky discharge of a gun on the 6th of June, 1822. The whole charge, consisting of powder and duck shot, was received in the left side at not more than 2 or 3 feet distance from the muzzle of the piece, in a posterior direction, obliquely forward and outwards, carrying away by its force the integuments more than the size of the palm of a man's hand; blowing off and fracturing the 6th rib from about the middle anteriorly, fracturing the 5th, rupturing the lower portion of the left lobe of the Lungs, and lacerating the Stomach by a spicula of the rib that was blown through it[s] coat, Lodging the charge, wadding, fire in among the fractured ribs and lacerated muscles and integuments, and burning the clothing and flesh to a crisp. I was called to him immediately after the accident. Found a portion of the Lungs as large as a turkey's egg protruding through the external wound, lacerated and burnt, and below this another protrusion resembling a portion of the Stomach, what at first view I could not believe possible to be that organ in that situation with the subject surviving, but on closer examination I found it to be actually the Stomach, with a puncture in the protruding portion large enough to receive my forefinger, and through which a portion of his food that he had taken for breakfast had come out and lodged among his apparel. In this dilemma I considered any attempt to save his life entirely useless. But as I had ever considered it a duty to use every means in my power to preserve life when called to administer relief, I proceeded to cleanse the wound and give it a superficial dressing, not believing it possible for him to survive twenty minutes. On attempting to reduce the protruding portions, I found the Lung was prevented from re-

turning by the sharp point of the fractured rib, over which its membrane had caught fast, but by raising up the Lung with the front of the forefinger of my left hand I clipped off with my pen-knife, in my right hand, the sharp point of the rib, which enabled me to return the Lung into the cavity of the Thorax, but could not retain it there on the least efforts of the patient to cough, which were frequent.

After giving the wound a superficial dressing, the patient was moved to a more convenient place, and in about an hour I attended to dressing the wound more thoroughly, not supposing it probable for him to survive the operation of extracting the fractured spicula of bones and other extraneous substances, but to the utter astonishment of every one he bore it without a struggle or without sinking.

After taking away the fragments of the ribs, old flannel, wad and the principal charge of shot, all driven together under the skin and into the muscles, and replacing the lungs and stomach as much as practicable, I applied to the wound the carbonated fermenting poultice, composed of flour, hot water, charcoal, and yeast, changing once every 8, 10, or 12 hours, according to the quicker or slower process of fermentation, keeping the parts around constantly bathed with a solution of muriate of ammonia in Spirits and vinegar. This was done with an intention to excite local reaction as soon as possible upon the surface and occasional sloughing of contused, lacerated and burnt muscles and integuments, which had the desired effect in less than 84 hours, with assistance of the Camphorated Aq. Amon. Acet. given internally in liberal quantities. Under the above treatment a lively reaction commenced in about 24 hours, accompanied with strong arterial action and high inflammatory symptoms of the system generally, more specially of violent pneumonia and inflammation of the Lungs, with great dyspnoea and distressing cough. At the commencement of those symptoms I opened a vein and took 12 or 14 oz. of blood from the arm. Gave a mild cathartic. The bleeding abated the action and gave relief. The cathc. had no effect, having es-

caped from the stomach through the wound. I continued the Caphd. Aq. Acetat. every hour for the first 72 internally and the carbonated poultice and wash externally, omitting the muriate. The fever continued for 8 or ten days, running into the Typhoid type and the wound becoming very fetid. Nothing passed his bowels after the 2d day, and they became impervious and inactive, scarcely to be excited by stimulating injections. From the 2d day till the 10th nothing passed, no reaction from his bowels at all, everything he took into his stomach was either absorbed or made its exit at the wound externally.

About the 5th day a partial sloughing took place in the wound and the febrile symptoms abated. The protruded portion of the lungs and the small lacerated piece of the stomach also sloughed off, and left the puncture of the Stomach plain to be seen, and large enough to admit my forefinger its whole length directly into the cavity of the stomach, and a passage into the cavity of the Thorax half as large as my fist, exposing to plain view the action of the left lobe of the Lungs, and admitting at every respiration full escape of air, bloody mucus, froth, etc.

About the 10th day a more extensive sloughing took place. The febrile symptoms all subsided, and the whole surface of the wound put on a healthy, granulating appearance. The fractures of the ribs commenced exfoliating, and nature kindly performing what human foresight viewed as hopeless and professional skill might calculate upon with dubious odds. All that entered his stomach came out again at the wound for 12 or 15 days, and the only means of sustaining him was by nutritious injection given per anus until all was sloughed, and compresses and adhesive strap could be applied to stop the orifice in the stomach and retain the food and drinks.

A lucky and perhaps the only circumstance to which his miraculous survival can be attributed was the protruded portion of the Stomach, instead of falling back into the cavity of the abdomen to its natural position, adhered by the first intention to the intercostal muscles, and by that means retained the orifice in the

wounded stomach in contact with the external wound, and afforded a free passage out and a fair opportunity to apply the dressings. The carbon poultice was continued constantly until the sloughing was complete and the granulating process established. They were afterwards occasionally applied as a corrective when the wound was becoming ill conditioned or languid. The Aq. Am. Acetat. was continued for several weeks, in proportion to the febrile symptoms or fetid condition of the wound.

No sickness or peculiar irritability of the Stomach was ever experienced, not even nausea, during the whole time; and after 3 weeks the appetite regular and healthy, alvine evacuation became regular, and all the functions of the system seemed as regular and healthy as in perfect health, excepting the wounded parts.

Cicatrization and contraction of the external wound commenced about the 5th week, and continued gradually and almost uninterruptedly. The Stomach at the wounded part became more and more firmly attached to the intercostals by its external coats, but showed not the least disposition to close its puncture by granulations forming from its own lacerated coats any more than is in the anus or mouth. By applying the nitrate of silver to the edges of the wounded muscles of the stomach, I could extend the attachments by its external and cellular coats more firmly to the intercostals or external integuments, which seemed rather to enlarge than contract the orifice in the Stomach, bringing it more and more external as its adhesions to the external wound increased, resembling in its appearance (all but the Sphincter) a natural anus, with a slight prolapse every time I removed the dressings, and the contents of the Stomach would run out fairly in proportion to the quantity received. If the Stomach happened to be empty when I dressed it, a prolapse and partial inversion of the Stomach would follow the removal of the compresses of lints from the wound, unless prevented by the application of my thumb, finger, or something else to its orifice while the dressings, when they had become looser than usual by some derangement of the bandages, the stomach would be inverted and the inner coats pro-

truded through the orifice large as a hen's egg. No difficulty occurred in reducing it; a gentle pressure with the thumb or finger upon the protruded portion would quickly return it to its place without giving the least pain and almost without sensation. Nitrate of silver, applied to the lips of the wound and upon the inner coats of the Stomach so as to produce sloughing, occasioned less sensation than when applied to the most common fungus or ulcer upon the surface of the body or limbs, a conclusive evidence in my opinion that the Stomach is not so exquisitely sensible an organ as is represented by anatomists and Physiologists in general.

About the 6th or 7th week exfoliation from the fractured ribs and the separation of the ribs from the cartilaginous ends began to take place; spiculae of bones and fragments of old cloth and shot also were working out from among the muscles and integuments. The 6th rib, that was worst injured and blown off entirely in the first place, was also abraded of its periostium for about three inches back of the fracture towards the Spine and became carious at its fractured extremity. So that I was obliged to amputate it about midway between sternum and spine, which I did by dissecting around, separating and retracting the intercostals to the sound portion of the rib, and then sawing it off by introducing between the ribs a very narrow, short saw, which I had made for the occasion. In this operation I succeeded admirably, beyond my most sanguine expectations, taking the rib off smoothly without injuring any parts whatever. The granulations shot immediately out and formed soundly over the amputated end. About half of the interior edge of the other rib exfoliated longitudinally from about the center to the Sternum, and then the healthy granulations formed soundly over the other part and continued so.

After removing all the exfoliations and extraneous substances that were to be found about the wound, my next object was to contract the external wound and close up the puncture in the stomach if practicable, which I attempted to by drawing the edges of the wound as near together as I could by adhesive straps

laid on in radiative form, the circumference of the external wound being at least 12 or 14 inches, the orifice in the Stomach about in the center. To retain the food and drink as much as possible, I kept to the orifice a firm compress of lint, fitted to the shape and size of the puncture, and confined by the straps. Under these dressings and management cicatrization went on rapidly, his health improving, and all functions of system regular. Digestion was as completely performed as in the most healthy person in the vicinity (and I could even see it go on every time I dressed the wound). I kept the granulating surface duly stimulated by applying sometimes Cincona pulv., sometimes Mirc. precip. Rub., and sometimes Nit. Silver, as the state of the granulation indicated.

After trying every means within my power to close the puncture of the Stomach by exciting adhesions between the lips of the wound of its own proper coats, without the least appearance of success, I gave over trying, convinced that the Stomach of itself will not close a puncture in its coats by granulations, and the only alternative left seemed to be to draw the external wound together as fast as cicatrization would form and contracting as much as possible the orifice in the Stomach, and make the granulations from the intercostal muscles and integuments shoot across and form over and close it that way. But to this method there seemed an insuperable difficulty, for, unless there be kept constantly upon the orifice a firm plug of lint compound, all the contents of the Stomach flow out and the patient must die for want of aliment, and this line, intersecting, prevents the granulation from forming across.

The lacerated portion of the lungs sloughed off and digested away, leaving a surface suppurating in the lobe of the lungs large as the concave surface of a teacup, from which continued to issue much purulent matter for two or three months until it became completely filled up with healthy granulations and cicatrized over externally, with the lower portion of the left lobe firmly adhering to the Pleura costalis. Four months after the injury an abscess formed about two inches below the wound, anteriorly, over the

cartilaginous ends of the 1st and 2d false ribs, very painful and extremely sore, producing a violent symptomatic fever, checking the process of cicatrization, rendering the granulation languid and pale, and the wound ill-conditioned and unfavorable to the prospects of recovery. After applying emolient poultices for several days, the swelling pointed externally, and I punctured and laid it open with the bistoury and director for about 2 or 3 inches. It discharged copiously very fetid, purulent matter for the first 2 days. On the 3d I could feel with the probe a small extraneous substance, which in the course of 3 or 4 days, by the use of the soap plaster and compresses, proved to be a shot and a small portion of the wad. After the exit of these I could introduce a common pocket-case silver probe nearly its whole length in the longitudinal direction of the ribs, and a great soreness and pain extended from the opening in the abscess upon the track of the cartilaginous ends of the false ribs to the spine, with a copious discharge from a long fistulous sinus. In the course of about 5 or 6 days [appeared] the cartilaginous end of a rib about an inch long; soon after this followed some small spicula of bone. The discharge, soreness and inflammation continued in the same direction. In about 6 or 7 days longer came away another similar cartilage about an inch and a half long, and in about the same length of time another 2 inches, and so continued to come away every 5 or 6 days, increasing in length in about the same proportion until five had made their exit through the same passage. The last was about three inches long, and seemed to be separated from the last false rib, as the soreness terminated at that point, and after which the sinus commenced closing, the discharge diminished, and the soreness subsided from that point forward with regular progression. The discharge, pain and irritation during the 4 or 5 weeks all those cartilages were working out reduced the strength of the patient very much, induced a general febrile habit, and stopped the healthy healing process of the original wound. Directly after exit of the last mentioned cartilage an inflammation appeared at the lower end of the sternum, about over the ensiform cartilage,

from the anterior end of the original wound, extremely irritable and very painful. By the use of emolient poultice a few days it terminated in a large abscess, which I punctured and laid open an inch or two with the bistoury. About half a pint of very offensive matter discharged from this, and in a few days followed a cartilaginous substance about 3 inches long, after which the inflammation subsided. In a day or two after this came away another small cartilage and the discharge abated. To support the patient's strength under all these debilitating incidents, I gave him the diluted muriatic acid and wine, which very much improved his health and increased his strength.

It is now going on the 7th month since the injury was received, and the orifice in the stomach is still visible and but little contracted. The Integuments are all cicatrized, smooth to within the circumference of a half eagle, immediately around the wound in the Stomach. His health daily improving, his spirits good, his appetite regular, his sleep refreshing, and all the functions of the system natural and healthy.

[The record is continued in detail to May 31, 1824, telling of discharge of sequestra of bone and costal cartilages, of various methods used to keep food in the stomach and of very gradual improvement.]

APPENDIX 4

CAPTAIN A. C. GIRARD, M.C., ON ANTISEPSIS, 1877¹

GENERAL: I have the honor to transmit herewith a report on the materials used in Lister's system of wound-treatment and their mode of application.

It is not necessary for my purpose to enter into a discussion on the yet undecided question of the *modus operandi* of the antiseptics, and I may therefore leave to other pens the task of elucidating, from the testimony extant, if the bacteria are the only causes of putrefaction — if there are different species of them, some harmless, some injurious — if they act mechanically or as a poison — if they can cause putrefaction in normal tissues or need a pathological focus for their functions, or simply act as a ferment under certain circumstances, or are bearers of a 'septic zymoid.' The only thing which concerns us here is the indisputable fact that there *are* germs or ferments in the atmosphere which will produce putrefaction in wounds, and that by preventing their ingress we can in most cases avert the complications which cause the greatest fatality in surgery. This is the key to Lister's system. For the sake of science it is to be hoped that, sooner or later, more light will be thrown on the physiological and pathological changes connected therewith. This will, however, not necessarily benefit suffering mankind, and we cannot wait for it and shut our eyes to the remarkable clinical results attained by Lister and his followers, because they cannot be explained to everybody's satisfaction. Be the 'germ theory' true, or partly true, or an absolute mistake, practically it matters not; for the present it is the best explanation we have for a most successful method and the best guide in its use.

It would unnecessarily extend the size of this report should I

¹ This was published to the Corps in Circular Orders No. 3, S.G.O., August 20, 1877, and to the American profession in the *Medical Record*, XII, 1877, pages 721-26.

attempt to relate the steps by which Mr. Lister gradually introduced and perfected the system of wound-treatment which I am about to describe. He first used it in his hospital in Glasgow in 1868, but ever since it has gradually been changed and improved on by him, and will probably undergo further changes in time. It has met with much indifference and with many enemies, but is gradually working its way into all the great hospitals of the civilized world.

During a sojourn abroad last winter my attention was particularly drawn to this innovation in surgery, as it has been introduced on the European continent but two years and was the almost exclusive topic of conversation of the surgical profession there. It happened that my first intercourse was with some of the most decided and renowned opponents of the system, and I became acquainted with all the objections to it before I had witnessed its advantages and benefits. I received therefore the glowing accounts of Lister's disciples with an incredulous ear, and it was only by travelling from one 'Lister hospital' to another that belief in its superiority forced itself upon me. I became convinced that if it is not the only proper wound treatment, it is the safest one, and renders conservative surgery possible beyond what had ever been believed. It would take volumes to describe all I witnessed, and I cite but a few examples. Who, before this, would have fearlessly opened the knee-joint for suppurative arthritis, as I saw done under the 'spray,' the patients recovering in a few days with a sound joint? Who would have expected an ovariectomy with general adhesions, in a woman of seventy-five, to heal in eight days without a symptom of reaction, or a laparotomy for the liberation of incarcerated peritoneal hernia, in a moribund patient, healing in six days, or a resection of the ulna in nine days? I observed several hip-joint resections recovering in the most favorable manner, numbers of compound fractures of the extremities knitting under Lister's dressing like simple ones; even comminuted fractures which formerly would have induced removal of the limb, united without an unfavorable symptom. Cancers

which had been removed with great loss of substance united by first intention; other tumors were extirpated and the operation caused no more inconvenience than a simple incision. The smell of putrefaction was banished from wards where scores of patients were lying with grave injuries and severe wounds. Hospitals which had been in use for centuries, and had become hot-beds of infection, where the majority of operations formerly were followed by pyæmia, gangrene and erysipelas, where everything had been tried to combat these evils, where treatment 'open,' 'occlusive,' by 'immersion,' compresses of chlorine water, carbolized water, salicylic acid, even Lister's 'gauze' and 'paste' had failed, became entirely free from these complications as soon as Lister's system with *all* its precautions had been introduced. Professor v. Nussbaum, Surgeon General in the Bavarian Army, told me that formerly he operated in his hospital with the greatest reluctance, as nearly every case was sure to be followed by grave accidents, even the opening of a panaritium or the amputation of a finger would cause pyæmia and death; wounds granulating in the most healthy manner, as soon as brought into his hospital, would become gangrenous and the patient would die, when a few days before he appeared to be on the eve of entire recovery. Now everything is changed. While during sixteen years, in which he had charge of the Munich General Hospital, pyæmia never failed a single month to make its appearance, until at last it seized 80 per cent of the patients, since the introduction of Lister's system it has absolutely disappeared. The same is the experience of Professor Volkmann in Halle. These are extreme cases, but they prove the more palpably the advantages of antiseptis. Other hospitals of more recent construction and less infection showed, of course, a lesser rate of improvement, but there, also, the rapidity of recovery and entire absence of complications were sufficiently plain proof to induce the surgeons to carry out the system with all the care observed in infected buildings. It has even found its way into private practice, and is used there also with great success.

It is difficult to adduce statistics in favor of a particular system

without going into details which would carry me beyond the scope of the present paper. A few examples might perhaps suffice. While in amputations of the thigh we find a usual percentage of deaths from 76 to 92, we find in the hospital of Professor Volkmann that six consecutive operations of this kind, and one ex-articulation at the hip-joint, recovered. Of twenty-seven consecutive amputations, of forty consecutive compound fractures, all recovered. Which other system shows like results? Before introduction of Lister's system, Professor v. Nussbaum performed thirty-four ovariectomies with sixteen deaths (47 per cent); since then, he made the same operation sixty-two times and lost only twenty-one patients (34 per cent) — of the last eight none. Lister's percentage of deaths during the two years preceding introduction of his system was 35, during the three succeeding years 15.

My personal investigations and studies were made with German surgeons, some of whom had become familiar with the system under Mr. Lister's personal supervision. Time and other plans prevented my visiting Edinburgh. In fact, I did not have the intention of pursuing this particular line of study abroad until it was forced upon me by the marvellous results I witnessed.

The purpose of this report is to communicate, in the simplest manner possible, the materials used in this mode of wound-treatment, their mode of preparation as applicable to our resources in the service, and the technical peculiarities of the dressing.

[In the year 1878 the following circular was issued:]

WASHINGTON, D.C., *November 6, 1878*

Weir's Antiseptic Spray Apparatus and the following dressings will be issued to medical officers of the Army upon requisitions approved by the Surgeon General, to whom they will be addressed through the regular channel. These dressings have been carefully packed for transportation and preservation:

Acid, Salicylic, in 2 oz. bottles.

Protective Oiled Silk (in cans), 1 yd. each.

Antiseptic Gauze (in cans), 5 yds. each.

Drainage Tubes (in cans), 3 sizes, 1 yd. each.

Hygroscopic Gauze (in cans), 5 yds. each.

Catgut Ligature (carbolized), in bottles, 3 sizes.

Salicylated Jute, in 1 lb. packages.

Gutta Percha Tissue — McIntosh (in cans), 3 yds. each.

[Nevertheless, antiseptis advanced little more rapidly in the Army than in civilian medical circles.]

APPENDIX 5

MEDICAL SERVICE IN THE PHILIPPINE INSURRECTION

[COLONEL LOUIS A. MAUS, Medical Corps, has contributed the following sketch of the dangers and difficulties of medical service in the field during the Philippine insurrection of 1899-1903. All who experienced the work at that time will recognize its general accuracy and its applicability to other parts than northern Luzon:]

To understand fully the many difficulties and dangers experienced by medical officers during this insurrectionary warfare it is necessary to know something of the character of the country and people. Along the lowlands of Luzon as far north as Appari, a distance of 400 miles, the country consists of one vast sugar and rice belt, thickly studded with populous pueblos and barrios surrounded by dense bamboo groves and rich tropical growth forming admirable points for the concealment of small armed bands.

Luzon, the largest island in the Philippines contains as many square miles as the state of New York and a population of from five to six million people. The numerous towns and villages in this area contained from two to twenty thousand inhabitants, all devoted to the revolutionary cause, and intensely opposed to American occupation. Practically all of the houses in a Filipino town or village were constructed of bamboo poles with thatched nipa roofs, doors and windows held together by rattan thongs. The floors were likewise made of whole or split bamboo poles and elevated, as a rule, from six to ten feet above the ground. Removable ladders were used for ascending or descending.

There was no sanitation in these rural villages previous to American occupancy. Human excreta and kitchen filth were de-

posited on the yard, the seepage ran into the nearby surface wells from which the drinking water was drawn.

Some of the larger towns, from five to ten thousand inhabitants, contained immense churches and convents constructed of stone or cement and a few large lumber dwellings and store houses owned by the rich foreign planters. During the insurrection the friars and wealthy foreigners, principally Spanish, fled to Manila for safety and their abandoned buildings were occupied by our American troops.

The camp or detachment hospitals connected to these commands were usually located in small nipa houses, furnished with primitive native furniture, or the army field equipment with gold medal folding cots. The medical supplies came from the field official chests or were drawn with considerable delay and difficulty from the depot in Manila, when obtainable. Owing to poor roads and poorer transportation, caraboa carts and native drivers, the greatest difficulty was experienced by medical officers in securing sufficient medicines and supplies for the care of their sick. Few who never served in the Philippines during the three or four years of early American occupancy, will be able to appreciate the dangers and discomforts experienced by our medical officers in the field at that time. Besides, one must take into consideration the intense heat and humidity of the climate, the long wet season, lack of ice and suitable food, and deprivation of amusement and social pleasures, the many dreary months of life in the midst of a primitive race.

Practically all of the rural towns and villages were poorly lighted with cocoanut oil dips at remote distances, and supplied with wretched mud streets scarcely passable in the rainy season. There were no theaters, libraries, newspapers or places of amusement beyond an occasional cock pit open on Sundays and holidays. After dark these towns presented the appearance of deserted villages.

To preserve order and combat guerilla warfare our government adopted a policy of occupancy of every pueblo and barrio of any

considerable size in the archipelago. With a limited number of medical officers attached to regiments each of which might be assigned to garrison from ten to twenty towns, the difficulty of medical attendance was obvious. As there were few extra medical officers it became necessary to divide stations into groups of from five to ten for each medical officer's district. Many of these posts were miles apart in the very heart of the enemy's country, and only accessible over poor roads or trails through a country infested by guerillas and bolo men.

Professional visits to these outlying stations were necessarily fraught with the greatest personal danger to the medical officer, who frequently made such visits alone, or at best were never accompanied by a personal guard of more than one or two men. Although several of these officers were killed or wounded in performance of this duty, I cannot recall one instance where they complained or refused to comply with orders. Besides their purely professional duties, they served as public sanitary officers in their respective districts with no little danger and greatly increased duties. Asiatic cholera of the most virulent type swept through the Archipelago in 1902 and the army medical officer at once became the sanitary custodian of these stricken villages, and so saved thousands of lives.

Serving as Chief Surgeon of General MacArthur's division of 22,000 men scattered over hundreds of isolated stations in the midst of guerilla warfare, I can personally testify to the splendid heroic conduct of our medical officers.

APPENDIX 6

AMERICAN MEDICAL OFFICERS SERVING WITH BRITISH COMMANDS IN THE WORLD WAR ¹

WHEN I became liaison officer in the spring of 1918, the Director General, Lieutenant General Sir Thomas Goodwin, who had also been liaison officer in our War Department at Washington, was quite disturbed over the complaints of these medical men. These complaints were also known to the other British commanders.

I found three basic reasons for their unhappiness, for unhappiness it really was:

1. Failure to get pay from the United States authorities. They had to live on their meager British allowance and borrowed to the limit from their fellow British officers. New from civil life, they did not know how to get their salaries, and the French mail did not always expedite American letters.

2. Many were in the front lines from June, 1917. No provision was made for leave for them and they worked until they were exhausted. They could not go to Great Britain. The British Expeditionary Forces officers were allowed two weeks every six months and our men simply relieved them. This we had soon remedied through General Ireland and General Goodwin.

3. *Promotion*. This unfortunate situation was not settled until after the Armistice, and until General Ireland energetically handled it at the War Department. The British commanders, the director general, the liaison officer, and the chief surgeon in France sent forward urgent recommendations without result. They had done excellent work and the British were very enthusiastic over them. I think I am safe in saying, as regards medical officers, this group had more casualties in killed, wounded and prisoners than all the rest of the American Expeditionary Force combined. The

¹ Extract from a review written by Colonel M. A. De Laney, M.C., of W. A. Chapin's book *The Lost Legion*, and published in *The Military Surgeon*.

British War Office recognized their value and in nearly three hundred cases decorated them for bravery on the field. Several of these officers were decorated twice. Of these officers, Dr. Chapin gives the names of thirty-seven who lost their lives. The first casualties of the American Expeditionary Force came from these medical men, Dr. W. T. Fitzsimons, being the first officer. Our Fitzsimons Hospital for Tuberculosis, Denver, Colorado, is named in his memory. As Dr. Chapin appropriately says in his preface:

‘It is fitting that somewhere in the annals of American History a portrayal of the services of 10 per cent of America’s physicians in France in the Great War be noted. With their service under fire amounting to five times that of their brothers in the American Army, their percentage of service is multiplied to 50 per cent of the whole. Surely one half of the medical history of the Americans in France during the Great War is deserving of note.’

Several officers had more than one wound. Captain McGregor of Pennsylvania lost both legs. He is now practicing medicine near Pittsburgh. Captain McGregor was seen in Lady Hartcourt’s (a niece of J. P. Morgan) Hospital, Lancaster Gate, London, very cheery and happy. It is stated that McGregor, after his bleeding stumps were dressed, had the soldiers bolster him up with dead bodies, and continued to dress the wounded. Several were cited for the Victoria Cross, which, unfortunately, could only be awarded to British citizens. These medical men were with the British Army, not only in France, but in Belgium, Italy, and Great Britain. Wherever their lot was cast there the best of feeling obtained and they were always accorded every consideration. The pen pictures of life in the trenches, the caring for the wounded, the customs, formalities and the courtesies of the British messes contained in this book, could well be studied by our medical officers. Dr. Chapin refers to the fact that the United States declined the British War Medal in 1919. During the years since the War I have had many letters about the medal from members of

the Lost Legion, why it was not accepted when the American Ambulance on duty with the French were permitted to accept a similar medal. To quote Dr. Chapin:

'In 1919 the British Government offered the British War Medal to all American officers, nurses and men who served with British commands, whether on the continent or in Great Britain. The tender was made through the Foreign Office to the United States Department of State. The State Department referred it to the War Department. A list was sent to the Surgeon General and he was asked if he would distribute them to the medical personnel. The Surgeon General said he would be glad to do so. At that time a board of officers, most of whom served only in the United States, passed on all such decorations. They knew nothing about the medal and considered it the same as the Victory Medal. They advised the Secretary of War to decline it on this ground, which was done.

'About 1920 or 1921 the British Government notified other governments that it would not issue any more decorations to foreign citizens and asked that the other governments not offer further decorations to her subjects.

'The Director General, Army Medical Service, fully appreciating what American doctors had done for them, many of whom had spent their whole service with the British Expeditionary Force, was greatly disappointed with the outcome.

'The Surgeon General, with the earnest support of General R. C. Davis, Adjutant General, again submitted the case to another board in 1922, but it felt inasmuch as the British Government had said it would not issue any more decorations, the United States could not reopen the matter.

'The medal has a buff and orange ribbon; the medal itself has the head of King George V on one side and a mounted soldier on the reverse. It is a real work of art.

'What harm this medal would do in an American home is hard to understand. Its award, on the other hand, would well forge another link in the chain of mutual goodwill between two great

nations. At the time of this writing, the subject has been reconsidered and it is quite probable that by fall this medal will be again offered to these Americans and accepted in their behalf by Washington. Let us hope so.'

APPENDIX 7

DESIGNATION AND INSIGNIA OF THE MEDICAL DEPARTMENT

UNTIL 1860 what is now known as the Medical Department was variously named at different times in Acts of Congress, being called the 'hospital,' 'hospital and medical establishment,' the 'medical staff,' and the 'medical department.' An act of June 21, 1860, referred to the 'medical corps'; one of August 3, 1861, to the 'medical staff'; one of April 16, 1862, to the 'Medical Department' in its title, the 'medical corps' in the body of the act, wherein it was specified that the medical corps was to consist of surgeons, assistant surgeons, medical cadets, and hospital stewards. An act of May, 1862, spoke of the 'medical inspector's department' as a part of the 'medical corps.'

Thereafter the terms 'corps' and 'department' were used indifferently until an act of February 2, 1901, which provided 'that the Medical Department shall consist of one Surgeon General . . . eight assistant surgeons-general . . . twelve deputy surgeons-general . . . sixty surgeons . . . 240 assistant surgeons . . . the Hospital Corps . . . and the Nurse Corps.'

The act of April 23, 1908, provided that from and after that date the 'Medical Department shall consist of a Medical Corps and a Medical Reserve Corps . . . and the Hospital Corps, the nurse corps, and dental surgeons. . . . From that time to the present the distinction between the Medical Department and the Medical Corps has been clear-cut.

The Dental Corps, as such, became a part of the Department in 1911 and the Veterinary Corps in 1916.

From 1818 onward, however, there have been regulations for the Medical Department, and since May, 1815, medical officers have been carried in the Army Register as belonging to the

Medical Department, so that may be considered the proper and long-time name of the medical organization as a whole.

At some time before or during the Civil War, there was adopted a coat of arms or seal of the Medical Department, described as follows:

Arms. — *Per pale: dexter an escutcheon paly, of seven gules and six argent: chief dexter azure charged with mullets, five fess ways and four paleways, argent: sinister argent charged with a serpent entwined on a staff paleways, all proper.*

Crest. — *A cock walking, gardant sinister, proper.*

Motto. — *Experientia et progressus.*

Medical officers were given a uniform in 1813. It was black; was like that of paymasters except that it had slightly different pocket flaps. Like all staff uniforms it had a high collar, reaching to the tip of the ear, and 'as high as possible' in front while still allowing the chin to be turned. In 1821, the coat had a velvet collar and cuffs, whereas the paymasters' had cloth. In 1840, a distinctive mark was the letters 'M.S.' on the epaulettes. During the Civil War the medical officer's uniform differed from others only in the fact that the full-dress sash was emerald green. In December, 1881, the caduceus was adopted as a collar ornament and cap ornament for hospital stewards. In 1890, a shield was adopted for a collar device for nearly all officers. In 1894, the modified Maltese cross was substituted for the shield, for medical officers. When the Hospital Corps was established in 1887, green trimmings were adopted for the uniform, and a red cross on a white arm band was also part of the uniform. As early as 1857, the hospital steward had a distinctive uniform. During the Civil War it was a bouquet of color; hat cord, buff and green; hat ornament, gilt wreath with 'U.S.' in white, one side of hat looped up with brass eagle, a feather on the other side; collar and cuffs piped with crimson; trouser stripe, 1½ inch, crimson; half chevron of green, two narrow half chevrons of yellow silk; caduceus of yellow silk on sleeve.

In 1901, there was a general revision of Army uniforms. The

Medical Department discarded green and adopted maroon as its color. The cross gave place to the caduceus as the collar ornament, and this is now (1928) the only article of the uniform which is peculiar to the Medical Department.

APPENDIX 8

OFFICE OF THE SURGEON GENERAL

PERSONNEL AND ORGANIZATION, JANUARY 1, 1929

SURGEON GENERAL

I. Executive Officer

1 Colonel in charge

(1) Office Management Section	Clerks	6
	Custodial	8
(2) Mail and Record Section	Clerks	16
(3) Office Supplies, Mimeograph and Circulation Section	Clerks	3
	Custodial	1

II. Personnel Division

1 Colonel in charge

(1) Commissioned Section	Clerks	3
(2) Reserve Corps Section		
2 Majors	Clerks	12
(3) Enlisted Section	Clerks	8

III. Planning and Training Division

1 Brigadier General in charge

(1) Planning and Operating Section		
1 Lieutenant Colonel		
1 Major	Clerks	2
(2) Training Section		
1 Captain	Clerks	1

IV. Finance and Supply Division

1 Colonel in charge

1 Major

(1) Finance Section	Clerks	3
(2) Supply Section		
2 Captains	Clerks	5
(3) Procurement Planning Section		
*1 Lieutenant Colonel		
*3 Majors		
*3 Captains	Clerks	6
(4) Specification Section	Clerks	2
(5) Cost Accounting Section	Clerks	3
(6) Hospital Section	Clerks	1
(7) Claims Section	Clerks	2
(8) Field Section	Clerks	4
V. Vital Statistics Division		
1 Major in charge		
(1) Statistics Section	Clerks	4
(2) Tabulating and Coding Section . .	Clerks	4
(3) Reports Section	Clerks	7
VI. Professional Service Division		
1 Lieutenant Colonel in charge		
(1) Preventive Medicine Section		
1 Major	Clerks	5
(2) Museum Section	Clerks	7
VII. Library Division		
1 Colonel in charge		
1 Lieutenant Colonel retired (temp.)		
(1) Library Section	Clerks	25
(2) Messenger and Labor Section . .	Employees	6
VIII. Nursing Division		
1 Major in charge		
1 Captain		
3 Lieutenants	Clerks	3

* Includes student officers at Army Industrial College.

IX. Dental Division

1 Colonel in charge

1 Captain.....Clerks 1

X. Veterinary Division

1 Colonel in charge

1 Captain.....Clerks 3

APPENDIX 9

STATISTICS OF THE CIVIL WAR

As the brief narrative of the Medical Department in the Civil War did not deal with statistics, the following items of general interest are here appended.¹

STRENGTH OF THE ARMY

	PRESENT	ABSENT	AGGREGATE
Regulars:			
January 1, 1861.....	14,663	1,704	16,367
January 1, 1862.....	19,871	2,554	22,425
January 1, 1863.....	19,169	6,294	25,463
January 1, 1864.....	17,237	7,399	24,636
January 1, 1865.....	14,661	7,358	22,019
Volunteers, White:			
July 1, 1861.....	169,480	849	170,329
January 1, 1862.....	507,333	46,159	553,492
January 1, 1863.....	676,175	212,859	889,034
January 1, 1864.....	540,643	237,650	778,293
January 1, 1865.....	523,536	309,395	832,931
March 31, 1865.....	554,720	294,351	849,071

Volunteers, colored, from September, 1862, to December, 1866: 'Average strength present, 35,640; absent, 6,699; aggregate, 42,339. The total number of deaths for the same period among the colored enlisted men was 33,380, being at the rate of 6,259 deaths for each year, or an annual death rate of 148 per 1000 of average aggregate mean strength.'

¹ *Surgical History of the War of the Rebellion*, Part First, Medical Volume.

The number of discharges for disability was as follows:

Enlisted men of the Regular Army.....	6,541
Enlisted men of the Volunteer Army.....	269,197
Enlisted men of colored troops.....	9,807
Total.....	285,545

The admissions of white troops to sick report were as follows:

May and June, 1861.....	27,717
Year ending June 30, 1862.....	878,163
Year ending June 30, 1863.....	1,757,645
Year ending June 30, 1864.....	1,510,000
Year ending June 30, 1865.....	1,406,001
Year ending June 30, 1866.....	245,954
Total.....	5,825,480

Of this total of 5,825,480 admissions to sick report, there were:

75,368 cases of typhoid fever, with 27,056 deaths
2,501 cases of typhus fever, with 850 deaths
11,898 cases of continued fever, with 147 deaths
49,871 cases of typho-malarial fever, with 4,059 deaths
1,155,226 cases of acute diarrhœa, with 2,923 deaths
170,488 cases of chronic diarrhœa, with 27,558 deaths
233,812 cases of acute dysentery, with 4,084 deaths
25,670 cases of chronic dysentery, with 3,229 deaths
73,382 cases of syphilis, with 123 deaths
95,833 cases of gonorrhœa, with 6 deaths:
30,714 cases of scurvy, with 383 deaths
3,744 cases of delirium tremens, with 450 deaths
2,410 cases of insanity, with 80 deaths
2,837 cases of paralysis, with 231 deaths
230,018 cases of gunshot wounds, with 32,907 deaths

The figures quoted above are from medical reports, and they do not include all deaths on the battle-field, those in Confederate prisons, etc. Revisions of estimates of death were made by the Adjutant General in 1869 and 1885, and from the last¹ the following figures as to total deaths are taken:

¹ *Statistical Exhibit of Deaths in the United States Army during the Late War*, compiled under the direction of Brigadier General Richard C. Drum, Adjutant General, U.S. Army, by Joseph W. Kirkley, Washington, 1885.

APPENDIX

	OFFICERS	MEN
Killed in action.....	4,142	62,916
Died of wounds received in action.....	2,223	40,789
Died of disease.....	2,795	221,791
Accidental deaths (except drowned).....	142	3,972
Drowned.....	106	4,838
Murdered.....	37	483
Killed after capture.....	14	90
Committed suicide.....	26	365
Executed by U.S. military authorities....		267
Executed by enemy.....	4	60
Died from sunstroke.....	5	308
Other known causes.....	62	1,972
Causes not stated.....	28	12,093
Total.....	9,584	349,944
Aggregate.....		359,528

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